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ORIGINAL COMMUNICATIONS.

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MALIGNANT DISEASE OF THE NOSE.*

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Occurring in the nose, a cavity so labyrinthine in structure, and even with present methods of examination so hidden from view in many of its recesses, malignant growth is frequently given an opportunity for considerable development and extension before the symptoms may be sufficient to call attention to the condition; and although the cases I report may offer nothing new, either in diagnosis, prognosis or treatment, they may, I hope, be of some service when added to many other recorded cases.

Whenever a malignant growth develops, the sooner it is removed the greater are the chances of eradicating it, and when there is suspicion of any growth being malignant the pathologist should be immediately called to our aid. In a general way, any vascular, more or less granular growth occurring in any locality within the nose should receive our immediate attention.

The symptoms associated with the early development of malignant nasal growth are found associated with many other less serious conditions. Hemorrhage may be an early symptom. General symptoms of rhinitis, as stuffiness, excessive secretion, and feeling of distention may be the only symptoms. Pain is not an early symptom, but was present in one of my cases.

When we have made a positive diagnosis of malignant growth in this region, it is often not an easy matter to decide whether or not to interfere, how extensively to sacrifice the surrounding tissue when we decide to operate, and how to alleviate, so far as possible, the suffering while the patient has to survive. Knowing that one has a fatal disease is none too pleasant, but when it is known that

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that disease may produce intense pain, affect sight and smell, and inflict an almost unbearable odor, it is a condition which demands any alleviation within our power to give. If only breathing space can be for a time re-established, and pain and pressure reduced, it may be right to operate, and I find that most people prefer to submit to an operation when that is the only improvement which can be promised.

I think we all, who have to deal with malignant growths in this region, as well as those who have to meet similar conditions in other almost inoperable places, long for some form of treatment, serum, opsonic, or other, which will enable us to meet and conquer this terrible condition; but until then we must do all possible within our power to give relief.

As the locality of the disease may not only modify the treatment, operative or other, but also very materially affect the prognosis, I shall, as a matter of convenience, place the cases I am reporting in three classes. In the first class, we will consider those in which the growth is attached to the septum; in the second class, those in which the disease is restricted to the turbinal bodies; and in the third class, those cases which apparently have their origin in the accessory cavities connected with the nasal chambers. The pathological reports again classify our cases, but as I have so few to report I shall not try to thus classify them, except to give pathological records.

Of the eleven cases upon which I have operated—

Two were attached to septum.

Three were attached to middle turbinate.

One was attached to extreme anterior end of lower turbinate.

Three had their origin in Highmore's antrum, and two were so extensive when examined that I had no idea of their origin.

The pathologist reported both septal cases as carcinoma, one of the turbinal cases as epithelioma, and the other two as sarcoma, the lower turbinal case as epithelioma, the antral cases, one as carcinoma, another as enchondroma, and the third as carcinoma with areas resembling odontoma, the other two cases as adenoma and sarcoma.

The youngest patient was 17 years, and the eldest 70 years of age. The average age was 45½ years. Five were males and six were females. Three had lost near relatives with malignant growth. The others gave no such history. There was nothing about employment or habits which gave any suggestion as to etiology.

Of these cases two only are now living, and one of these, Mr. J. McN., came to me 12 years ago. He was a well developed and healthy appearing man, 46 years of age, a salesman by occupation, and with a family and personal history of almost perfect health. He consulted me on account of nasal hemorrhage which was and had been his only symptom of disease. The cause of his hemorrhage was found to be a tumor about half an inch in diameter attached to the right side of the septum, at about the junction of the cartilage and the vomer, perhaps a little more over the vomer than the cartilage. The attachment was by a pedicel about one-fourth inch in diameter. The macroscopic appearance was that of an irregular nodular, bluish red colored polyp, which bled profusely after being moved by a probe.

I removed the mass with cold snare and cauterized the base very thoroughly with electric cautery. As the pathological report was carcinoma I kept close watch of patient and at the end of four weeks there were signs of similar tissue springing from the original site. I advised removing all of the septum at this area, including about one-third inch of apparently healthy tissue. This was consented to by the patient, and under cocaine with cartilage knife and scissors I removed the cartilage, bone and mucous membrane covering in one piece. This produced a very large perforation but it was so far back that there was sufficient cartilage anteriorly to maintain the proper contour of the nose. The pathological report upon the excised portion of septum was that the tissue at circumference was normal but at site of trouble there were areas of carcinomatous tissue, and also simple granulation tissue. This man has remained in perfect health since and this may give some hope in cases of malignant growth occuring in the nose, if so situated and of such extent that they can be removed entirely.

A case which belongs to this class, so far as symptoms, diagnosis, and treatment are concerned, was that of Mrs. T., 47 years of age. She was a widow with moderate means and though well nourished had a rather careworn appearance. She had been troubled with epistaxis for about six months. She was referred to me Nov. 27, 1897, by her family physician, Dr. Geo. E. Thompson, for an attack much more severe and of several hours' duration. The hemorrhage was from the right nostril and after stopping the flow of blood with a cotton plug I found that it was coming from a tumor about the size of a pea, rather nodular and vas-

cular, attached to the septum anteriorly at about the location so often found irritated and abraded by picking the nose.

I removed the growth with cutting forceps and cauterized base with electric cautery. The excised portion was reported by the pathologist to be carcinoma. I requested patient to visit me for inspection but she did not come again until 5 weeks later when there was again hemorrhage. At this time at the posterior border of the operative area was a bluish red tumor about the size of an apple seed. I removed the septum for about a quarter of an inch about the diseased area, removing slightly more cartilage than perichondrium and mucous membrane, so that these would cover cartilaginous border of perforation made. There was comparatively rapid healing and no return of the growth at the end of 14 months, the last time I saw her. At about this time she removed to Maine where she died 18 months later of what was diagnosed as carcinoma of the uterus. There were no symptoms of any nasal disease during this period.

The next case is in a class much more formidable, due to location of origin, and extent of involvement. Mr. C. was referred to me by his family physician, Dr. Frame of Rockland, Mass., for a bleeding polyp of the right side of nose. He was a well developed and nourished man of 37 years of age, and his only symptoms were stuffing and bleeding of the right side of the nose, and some pain neuralgic in character over right side of head and at occiput. Nasal inspection showed a livid colored growth filling nares from about one-half inch inside anteriorly to about one-third inch from posterior choana. The least probing was followed by profuse hemorrhage. I removed piece of anterior end about size of hazel-nut for examination and the report from pathologist was that we had a spindle-celled sarcoma. Hoping that perhaps the attachment might be to middle turbinate and nowhere else, I advised immediate operation. The patient dreaded to undergo the same and deferred operation for about three weeks, when the pain became so severe that he sought any relief. At this time the growth had appeared at anterior nares, and there was distinct exophthalmos of the right eye. Under ether I removed the greater mass of growth with middle turbinate, but I found that it had filled ethmoid, and had pushed through cribriform plate. The case was of course hopeless, and I did not try to do more. Fortunately there was only one more week of suffering. This case illustrates

how rapidly these growths can advance and how soon they may get beyond relief.

Case second in this class is Mr. L., who was referred to me by Dr. Tirrell of So. Weymouth, Dec. 7, 1897. Mr. L. was 62 years of age, was a wiry, rather small and somewhat anaemic man. He had always led an out-of-door life, His father died of pulmonary tuberculosis, his mother of cancer. There were then three living brothers, and one brother and one sister dead.

He had been in perfect health until about three years before consultation. The first symptoms were those of a cold in the head.

This symptom in various intensity had remained and the last weeks there had been pain. At first there was a pressure as of something pushing on nose, but lately considerable pain in nose and right eye. The right side of nose was pushed outward and a vascular nodular tumor apparently attached to right middle turbinated area filled the whole right nasal chamber. This bled very easily and there was considerable hemorrhage following a careful use of the probe.

Five days later under ether I removed with a hooked knife the middle turbinate with the attached tumor which was fully the size of a pigeon's egg. The inner wall of antrum had been pushed outward as had also the orbital plate. A specimen of this growth was examined at the pathological department of the Boston City Hospital, and was found to be carcinoma. This man has had no recurrence and Dr. Tirrell reports him as a healthy man to-day, 72 years of age.

The third case in this class was a Hebrew girl 17 years of age. She first came to me complaining of some pain in the right side of the head and stopping of the right side of the nose. She was at this time fairly well nourished and developed but she said she had lost considerable weight.

Under cocaine, anterior inspection of the nose showed a polyp-like but vascular mass, apparently in the naso-pharynx. This was shown by post-nasal mirror to practically fill the right side of the naso-pharynx.

The following day I removed the tumor with cold snare and cauterized the base with electric cautery. The growth was rather nodular and vascular and about three-fourths of an inch in long diameter and one-half inch in other. The pathological report was that we had a myxofibroma, and not a sarcoma as we had thought.

In three weeks there was another growth in all appearance like the first. I removed this together with the posterior two-thirds of the turbinal body.

The pathological examination of this specimen showed myxomatous and granulation tissue.

About four weeks later patient consulted me at my office as I was not then on duty at the City Hospital. There was now exophthalmos and complete blocking of the right side of the nose and naso-pharynx. I referred her back to the hospital and Dr. Leland removed a specimen for examination. This time it was reported that she had a rapidly growing spindle-cell sarcoma. The patient was admitted to hospital and Dr. Munro performed the Cheever operation, followed by death the next day. An autopsy could not be obtained but the operation showed that the process had extended into antrum, ethmoid, sphenoid and orbit.

John W., a robust man of 51, with an excellent family history and a perfect personal history except for children's diseases, consulted me February 11, 1903, for a painful and obstructive growth in anterior portion of nose. This he says to his knowledge he had had for about a year, but pain had been present about three weeks.

Examination showed a greyish red irregularly shaped tumor about 1-3x1-8 inches attached to anterior end of the right lower turbinate. The surface towards the septum was abraded and showed signs of ulceration. This was classified by the pathological department at the City Hospital as carcinoma. Under cocaine I removed the growth with considerable of the surrounding tissue. I adjusted and sutured edges of wound but on second day they pulled apart. The wound, however, was entirely healed at the end of the month. About three months after operation the patient began to have pain, and what he described as a sensation of pressure in the head. He slept poorly and lost weight rapidly. His symptoms increased and he finally died at the end of four months, just seven months after operation. Dr. Mahon, who saw patient the last few weeks of his life, reported that there was finally paralysis of whole left of the body and almost total blindness before death. Relatives refused autopsy so we can only reason by symptoms that there was probably extension into cranial cavity through the lymphatic or venous channels.

On Oct. 3, 1903, Mr. J. C. M. consulted me for a severe neuralgic pain in right cheek and eye. This had existed for five

weeks but was increasing in severity and frequency of attacks. For the few days previous to examination, the pain had been practically constant. Mr. M. was 53 years of age, weighed some 220 pounds and had the appearance of one who had been suffering. His pulse was 108 and his temperature was normal. His history, family and personal, was excellent. The right eye was apparently slightly prominent. The conjunctiva was injected. The vision was normal. On the right side of nose the mucous membrane was much inflamed, and there was considerable pus in the middle fossa. The right antrum was much more opaque than the left. After passing trochar I tried to cleanse antral cavity, but very little solution came from the ostium. A probe passed through trochar gave the sense of entering some pulpy material. Radical operation was advised but patient declared he would die before he would take ether. I saw him again two weeks later and at this time there was no doubt about the exophthalmos. There was a brownish red polyp in the middle fossa. A small piece of polyp was removed for examination and found to be carcinoma. The condition became rapidly worse and at end of four weeks there was total blindness which lasted nine days, when there was sudden death. There was no examination of the eyes after my second examination and yet I believe the carcinoma had extended into orbit and probably into cranial cavity.

On Oct. 11, 1906, Miss L. H. consulted me on account of nasal pressure and inability to breathe through nose. She was 30 years of age and poorly nourished, of a sallow complexion and a constant mouth breather. The first important fact in her past history was stuffing and tinnitus in left ear two years before. There had been plugging of nose about the same time. This had grown worse and about a year before consulting me she had been operated upon under ether at some hospital in New York. She could not tell the name of hospital or the surgeon who operated upon her.

Examination showed the right side of the nose to be filled with pus and polypoid tissue. The left side contained much thick foul pus and a very vascular kidney colored polypoid growth. A similar growth filled the naso-pharynx, pushing the left side of the soft palate forward. There was a small cicatrix in the left canine fossa.

I advised the patient to go to the hospital where I could operate upon her immediately, but this she did not do. On November 22, over five weeks later, she again came to my office. There

was now left exophthalmos and considerable pain, and she was willing to undergo an operation. The disease seemed so extensive I did not give a very good prognosis, and she did not appear at St. Elizabeth's Hospital until December 7th. I now found her to be suffering much pain. She had lost much weight, the pulse was weak and there was slight elevation of temperature. She was now determined to have something done. Under ether I made incision under the left lip from anterior border of canine fossa as far back as the second molar, the cheek was dissected to above the zygoma and to the infra-orbital foramen and what was left of the necrotic anterior wall of the antrum was removed. Through this opening was removed the growth which filled the antrum, the ethmoid, and the sphenoid cells, the posterior portion of left orbit as well as the whole left nasal and naso-pharyngeal cavities. The patient never thoroughly recovered from the ether, and died the night following the operation.

Dr. Leary who examined the growth reported it to be an endothelioma.

The third in this class was Rev. Dr. P., 70 years of age. He was referred to me by Dr. Darling for nasal obstruction and discharge from the left side of the nose. I first examined him March 18, 1907. He was a well preserved man for one of his years and except for prostatic trouble had been in good general health. Examination showed a very vascular pulpy growth about size of a cherry and apparently attached between the middle and the lower turbinate at usual ostium of the antrum. Trans-illumination showed much obstruction to light on the left side.

I advised immediate operation, fearing malignancy and hoping by performing a radical operation upon the antrum to perhaps eradicate the disease. As the patient had much church work which he had promised to perform, he put off operation until June 6th, when the tumor nearly filled nose and naso-pharynx. I was able by removing lateral wall of antrum to clear out that cavity, and then to remove through naso-pharynx the detached growth, which was the size of a goose egg. Dr. Mallory reported tumor to be carcinoma with areas of odontoma. So far as possible I removed all infected tissue and after the operation the patient quickly rallied and had no symptoms until the last of August, when there was again a very rapid development of the growth. As there was much distress from this second growth and as the patient very

much wished a few more weeks of life to complete certain work he desired any possible relief, and Sept. 5, he was again operated upon. There were after last operation several weeks of comfort. In November there were signs of a return of the disease and death came December 16, 1907.

Mrs. L. G., a poorly nourished, anaemic woman, 34 years of age, consulted me Jan. 8, 1901. Her father was living, her mother died of hemorrhage from the uterus. Her first symptoms began eight years before when she had trouble about breathing through right side of nose; there was also considerable nasal secretion. Her family physician had removed considerable flesh from the right side of the nose which he said was a polyp. Several times there had been operations upon the nose. These gave temporary relief. The last operation was about four months before coming to me. At this time there had been profuse hemorrhage and very little was accomplished. There had been much loss of weight and strength during the previous year.

The right side of the nose was filled with a brownish bluish red mass which had extended into the naso-pharynx sufficiently to block the left side.

Under cocaine I removed much of the mass from the right side of the nose and the entire mass from the naso-pharynx. The growth had entered or was in the antrum, filled the attic, was attached to lower turbinate and it was impossible to learn its origin. Pathologically it was round-cell sarcoma.

As patient lived in a distant village I did not see her again but a sister wrote me the following: "My sister was given much relief by your operation for about eleven or twelve weeks when there was a recurrence of her old symptoms. She grew quite rapidly worse and died Nov. 19, 1901. After she found she had cancer she said she would try to do no more."

This case was likely one of simple polyps at first and was operated upon several times for that condition. There seems no way of judging whether there was any connection between these and the first tumor which was sarcomatous.

Mrs. N. M. G., a well nourished and healthy appearing woman, 53 years of age, consulted me March 7, 1904. Her mother died of cancer of breast at 61 years of age. One sister died of uterine hemorrhage at about 46 years of age. Two brothers and three sisters were living and in good health.

Mrs. G. was the mother of three healthy children and had always been in excellent health herself until about one year before consulting me. Her first symptoms were those of simple rhinitis. These gradually increased until at end of five months she consulted a physician in Philadelphia. He told her she had a bad ozaena and gave some oily spray which she used for about three months. The symptoms gradually increased, there was inability to breathe through the nose most of the time, and at times a severe heavy pain over the eyes and at occiput.

For ten days there had been more or less nasal hemorrhage.

Examination showed a liver colored nodular growth filling both nares and pressing soft palate forward. The lower edge was visible in pharynx below palate.

I removed a section for pathological examination and Dr. Mallory reported it to be adenoma. There was such an extension of disease that prognosis was exceedingly poor, but patient wished to be relieved of nasal obstruction if but for a short time.

Under ether the nasal cavities and the accessory cells were cleared so far as possible but the growth had filled every space.

For six weeks patient was very comfortable when the right side of the nose became plugged. There were a few hemorrhages, but not of severe type until July 1, when there was a severe hemorrhage from mouth, and death followed before surgical aid arrived.

The study of these few cases shows how rapidly these nasal growths, whether carcinoma, endothelioma, or sarcoma, may progress, how they push into and fill the labyrinth of sponge-like cells of the ethmoid and the sphenoid, how liable they are to break down the base and enter the floor of the cranial cavity, and how extensive they are liable to be when first the patient consults a physician.

In preparing these reports I have been surprised to find how frequently growths in the nose which I feared might be malignant from the general appearance were reported to be benign by the pathologist.

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THE TREATMENT OF FRACTURES AND DEPRESSED DEFORMITIES OF THE NOSE BY A NEW METHOD WITH THE USE OF A COMBINED BRIDGE AND INTRA-NASAL SPLINTS.*

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It is not due to lack of appreciation on the part of the writer for the excellent operations devised by several men for the correction of deformed noses, that a review of their work is not attempted, but rather to a lack of space in this short paper, which is intended chiefly to bring to your attention a practical method for retaining the parts of the nose in their proper position until union has occurred after fractures, both accidental and operative, the chief object being to prevent depression of the bridge, and to preserve the integrity of the nasal passages. It is intended, therefore, to be complementary to the various operations involving the fracture and mobilization of the nose for old deformities, as well as recent accidental fractures; and it presumes to fill a long felt want; namely, that of a splint that will exert pressure in such a manner that the nasal tissues, once placed in proper position, will be held so until union has occurred.

In looking over the text-books dealing with this subject, I have been impressed by the lack of confidence which the writers show in the methods they advise for immobilizing the nose after fractures, and in correcting depressed deformities. The devices in use for this purpose may, for convenience, be classified as: (1) Extra-nasal. (2) Interstitial. (3) Intra-nasal.

Of *Extra-nasal* appliances, those most frequently advised are plaster strips drawn across the nose and attached to the cheeks, a small roller bandage being placed on either side of the nose. This method, or some slight modification, is recommended in almost every text-book on surgery. Some of these authors, however, admit its inefficiency and the uncertainty in results attending its use. The chief objections are: (1) It is impossible to immobilize the part by attaching adhesive plaster to the skin, which is movable. (2) The plaster presses down upon the nose and tends to produce or increase any tendency to depression. (3) This method of treatment

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takes no account of intra-nasal conditions. (4) The results obtained are very uncertain.

Practically the same objections may be raised against the various forms of splints or moulds attached to bands to be worn around the head. It is impossible to adjust them so that they will not slip, when they may do more harm than good.

Interstitial measures include such expedients as Martin's bridge, bridges made of celluloid, hard rubber, silver, etc., introduced under the skin. The disadvantages of a foreign body under the skin are unquestioned. It is the common experience that they slough out.

On the other hand, in moderate degrees of depressed deformity, and especially where the nose is not too broad, the subcutaneous injection of paraffin is very satisfactory. It is also useful as a supplementary procedure to operative measures. It is reasonably certain that hard paraffin is neither absorbed nor organized, but is encapsulated, and remains permanently in situ if properly injected. Ulceration and expulsion of the mass has occurred in rare instances, but never to the writer's knowledge when injected into the tissues of the nose. On general principles, however, it is far preferable to correct a deformity by rearranging the natural tissues than by filling in the irregularities by the introduction of a foreign substance.

Intra-nasal appliances for the support of the bridge in the treatment of depressed deformities, and as a preventive of impending depression, are the most common of all methods of treatment. A brief consideration of the architectural structure of the nose will show how ill adapted are such means to the mechanical conditions to be overcome. The nasal cavity may be compared to a truncated cone, with apex pointing forward. The roof of the nose, if prolonged forward, would meet the level of the floor at an angle of about 70 degrees, therefore any object, such as a splint that could be passed through the anterior naris, the vertical diameter of which is only three-eighths of the distance from the middle of the nasal bone to the floor of the nose, could not possibly exert any lifting force upon the dorsum, but on the other hand would, by its horizontal pressure, drag the dorsum downward, thus increasing the tendency to flattening. This applies especially to compressed cotton splints, the horizontal pressure of which is considerable. An additional disadvantage is that the patient is forced to breathe through the mouth.

In regard to the operative treatment for old depressed deformities, those cases present the most favorable operative possibilities where there has been little or no loss of tissue, as in those resulting from trauma. Old syphilitic cases are inoperable, and atrophic rhinitis cases are difficult, and the results uncertain on account of defects in the development of the nasal bones, the extensive absorption of all the tissues and the increased dangers of infection from the purulent secretions.

In operating there must be thorough mobilization of all the nasal tissues. This can be accomplished with the Adams forceps, and by using the chisel either from within or from the outside of the nose. Where the nose is particularly broad and flat, a portion of the nasal processes of the superior maxillae may be chipped off and used in building up the arch. Normally this process forms about one-half of the nasal arch, and according to Berens the grain runs

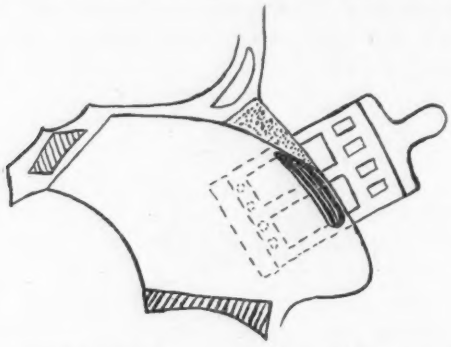
upward and forward, so that there is no danger of the split running into the orbit. The nasal duct must be thought of, but according to the observations of the writer upon a large number of skulls, this duct, which runs downward and backward corresponding to a line drawn from the inner canthus to the first molar tooth, is placed five-eighths of an inch behind the anterior border of the nasal process of the superior maxilla. It is, therefore, safe in the ordinary operation.

In most flat-nose cases the dorsum is held down by the shortened septum. To overcome this difficulty, I have devised a plastic and sliding flap operation that will permit of the septum being lengthened without leaving a perforation. This will be described in connection with one of my cases.

The special instrument to which I wish to call your attention consists of a bridge made of steel, and as light as is compatible with strength. The bridge is formed by two curved, fenestrated wings two and one-half centimeters wide, and joined by a hinge. The

distance that these wings can be separated is regulated by a thumb-screw. The edges of the wings diverge to correspond to the shape of the nose, they are padded with rubber, and near the margins are small holes which permit of additional padding of gauze being stitched on. The second part of the apparatus consists of two narrow hard rubber splints, perforated by four small holes.

All the precautions necessary for an aseptic operation are observed, and the patient is placed under the influence of a general anaesthetic. Assuming that the nasal tissues have been thoroughly mobilized, the application of the apparatus is as follows: No. 14 iron-dyed silk is passed through one of the perforations in the splint and knotted, (the hole is selected according to the distribution of the lifting force desired), the other end is threaded into a

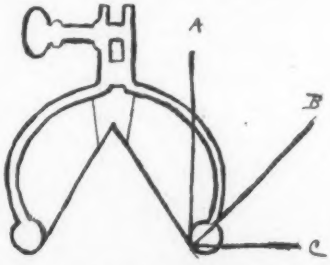


large curved needle, this is passed from within the nose through the dorsum; we should endeavor to perforate the fibrous, triangular interval between the upper lateral cartilage, the lower lateral cartilage and the septum, and near the latter. The roof of the nose is thin and very easily perforated. The splint is now drawn into the nose and adjusted to the roof. This process is repeated on the other side. The bridge is then applied and the wings adjusted with the thumb-screw to give the proper support to the base of the nasal triangle. The sutures are now run through the fenestrae of the bridge immediately above their exit from the nose and drawn tight enough to lift the dorsum into its proper position and reduce the deformity (a slight over-correction is to be preferred), the sutures are then tied together over the hinge of the bridge, using only sufficient tension to support the dorsum. The apparatus is automatically held in position, and there is no tendency to displacement;

it should be worn for a week or ten days, or even longer; during this time the patient should remain in bed. In fractures of the nose, union occurs more quickly than in any other part of the body, in uncomplicated cases there is fixation in eight days and bony union in a fortnight. Since practicaly all fractures of the nose are com-

pound fractures, in my opinion the patient is subjected to no additionai risks from infection by the introduction of a sterilized silk suture through the dorsum. This view is borne out in the only two cases that I have had the opportunity to operate upon by this method.

The mechanics of the apparatus may be illustrated diagrammatically:



The line (A) vertical to the base of the nasal triangle represents the downward pressure of the bridge, produced by the tension of the sutures on the dorsum. The horizontal line (C) represents the pressure exerted horizontally by the wings and controlled by the thumb screw. The mean direction of pressure (B), therefore, that is actually applied to the base of the nasal triangle bisects the angle

formed by the vertical and horizontal lines, and gives us the proper support at the base, while the lifting force is applied to the apex through the sutures attached to the intra-nasal splints. The combined action of these forces, therefore, would tend to construct a symmetrical nose.

The instrument was developed after thorough experimentation on the cadaver, and has been used with satisfaction on the following cases from Drs. Knight and Smith's clinic at the Manhattan Eye, Ear and Throat Hospital.

Case 1. The first patient is a pugilist, 21 years of age, of good family and personal history.

Three years ago, while jockeying in a race, he was thrown from his horse; falling on his nose, he fractured it. Following the injury his nose was flat and he was unable to get the slightest amount of air through it.

Examination showed a broad, flat nose. Both nares were completely obstructed by the thickest septum I have ever seen.

On January 23d, I did a submucous resection of the septum and found an unusual condition: the septum was double, consisting of two irregularly parallel layers of cartilage and bone, separated by an interval filled with connective tissue. On account of synechia the elevation of the mucous membrane was difficult; I succeeded, however, in removing the obstructing cartilage and bone with my punch forceps, giving a clear nasal passage without perforation of the septum. The nasal cavities were packed with sterilized vaseline gauze, and the case progressed satisfactorily.

On January 28th, five days after the first operation, the patient, having been properly prepared, was etherized, and the following operation performed: By using the padded handle of a mastoid curette and mallet externally, and the chisel and Adams forceps internally, the nasal bones, which were separated and overriding the nasal processes of the superior maxillae, were thoroughly mobilized, and the ridge of the septum, left after the submucous operation, was separated from its connection with the vertical plate of the ethmoid; this process is homogeneous in structure, and should not be fractured, as the split is as apt as not to run into the cribriform plate. The septum, following the submucous operation, was found lax enough to permit of the dorsum being raised. There was some backward displacement of the lateral cartilages at their junction with the lower edges of the nasal bones, so I introduced

a Miles rectangular septal knife, and cut through the connective tissue at this point, enabling me to lift the cartilages into their proper place.

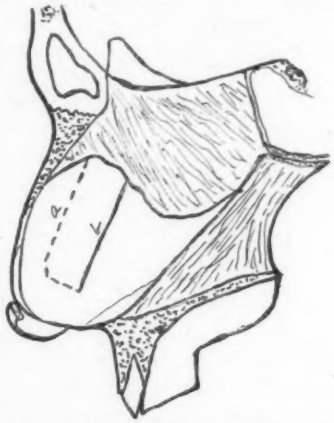
For bringing the parts into their normal relations and retaining them there until union had occurred, I used the apparatus previously described.

The nose was irrigated twice a day with Dobell's solution, and was kept lightly packed with vaseline gauze.

The bridge was removed on the eighth day, the suture holes closed promptly and without a noticeable scar.

The result was very satisfactory both from a functional and aesthetic point of view.

Case 2. The second patient is a man, of good family history, and no history of venereal disease. He has suffered with atrophic

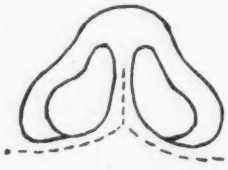


rhinitis since early childhood. The crust formations have always been abundant.

The nose was broad and flat, almost on a level with the face. The nostrils were broad and shallow, the alae being very widely separated. The nasal cavities were very roomy and covered with crusts. The inferior turbinates had disappeared and the middle turbinates were very small. On palpation no nasal bones could be discovered, and the slight elevation of the nose was due almost entirely to the nasal processes of the superior maxillae, which were widely separated. Altogether the case presented about as hopeless an aspect as I have ever seen. The local and general conditions at this time precluded the possibility of an operation.

He was put upon tonic treatment, was instructed to irrigate the nose three times a day with salt and soda solution, and three times a week the mucous membranes of his nose were thoroughly rubbed with 25 per cent argyrol solution. At the end of four months the crust formation had ceased, and the nasal conditions were as nearly normal as I could hope to get them; so I decided to do the following operation on April 3rd. The face and nose were aseptically prepared, and the patient etherized.

The septum, which was entirely too short to admit of raising the dorsum, was first subjected to the following procedure. Through a button-hole slit I elevated the mucous membrane on the left side of the septum. With a sharp-pointed bistoury, beginning at the anterior edge of the vertical plate of the ethmoid, I divided the *cartilage* and the *mucous membrane* of the other side at a high level, and the *mucous membrane* of the left side at a much lower level, this leaving a long flap of mucous membrane attached to the upper segment of the septum, which was intended to fall into the interval between the segments of the septum and prevent a perforation when the dorsum was raised.



The fore-part of the septum was lengthened in the following manner: Downward from the center of the septum, an inverted Y-shaped incision was made, separating the columnar cartilages and continued under the floor of either nostril, making two flaps which were brought together in the median line and sutured with fine silk, thus doubling the length of the septum and raising the tip of the nose. The incision in the floor of either nostril was then extended under the alae, liberating them so that they could be brought toward the median line and sutured, thus narrowing the nostril and producing a shapely nasal orifice.

An effort was then made to reconstruct the bony framework of the nose. A small incision was made on either side of the nose over the nasal processes of the superior maxillae; by using a chisel and moving the tissues up and down, I succeeded in chipping off quite a strip of bone on either side, to be used in building up the

nasal arch. The nasal bones had completely disappeared from atrophy. With the Adams forceps, one blade of which was covered with rubber to protect the skin, I worked these pieces into position and thoroughly mobilized the dorsum of the nose. The nasal bridge and splints were then applied. The nose was irrigated twice a day with Dobell's solution, and lightly packed with vaseline gauze.

As I feared, on account of the attenuation and low vitality of the mucous membrane of the septal flap, it partially sloughed, leaving a perforation.

When the bridge was removed on the seventh day, the improvement in the contour of the nose was marked, and the result much

better than we had expected. The intra-nasal conditions were equally improved, as the cavities are far less roomy; this, no doubt, will exert a beneficial influence on his atrophic rhinitis.

The permanency of the improvement in this case depends upon the arch constructed from the nasal processes of the superior maxillae, the dorsal segment of the septum, and the lengthened anterior portion of the septum.

In conclusion, I will say that the instrument has the great advantage of restoring the function of the nose as well as its contour by a re-arrangement of its parts without the introduction of foreign substances into its tissues.

Its efficiency depends upon the principle that the best way to correct a deformity is to reverse the direction of the force that produced it.

NOTE.—The improvement in both cases has remained to date, August 25, 1908.

69 West Fiftieth street.

SOME OBSERVATIONS ON HYPERESTHETIC RHINITIS (HAY FEVER) WITH SUGGESTIONS FOR ITS RATIONAL TREATMENT.*

BY OTTO J. STEIN, M. D., CHICAGO.

My observations on the study of hyperesthetic rhinitis, or so-called hay fever, lead me to the belief that this much misunderstood and much mooted subject is not so intricate as many authors would have us believe.

It will be impossible at this time or in such a paper to undertake to discuss each and all of the various theories that have been advocated in the explanation of the classification of this disturbance. My remarks at present are but the expression of a few observations I have made from the study and treatment of a great number of such cases.

In order for you to understand my position as to the classification of this disorder, I wish to say at the outset that every synonym applied to this affection other than hyperesthetic rhinitis should be rejected, on the grounds that they are misleading and confusing, and because the latter more correctly states the true condition present.

The writer believes this disorder represents a hyperesthesia of the trigeminal nerves, created by the instability of the body fluids and manifesting itself as a rhinitis with various reflex phenomena.

There is some internal factor at work undermining and lessening the stability of the nerve tissue, and that factor I believe to reside in the fluids of the body. This thought has given birth to the many opinions expressed by different observers and investigators in their uric acid theory, intestinal toxic theory, anemia theory, saliva theory, etc. What is called the idiosyncrasy of the patient is nothing but a perversion in the metabolism, whereby some one or several of the fluids of the body become sufficiently changed from their relatively normal composition, so that whatever nerve tissue comes under its influence becomes susceptible to irritation. Thus is furnished the first element necessary for the manifestation of the disease. The common belief that this hyperesthetic condition is created by a general neurotic temperament becomes untenable from

*Read before the American Academy of Ophthalmology and Oto-Laryngology, Louisville, Ky., 1907.

my viewpoint. Many authors maintain that such a condition is absolutely essential to its origin. But I am not alone in having observed cases that were phlegmatic in all but their hyperesthetic fifth nerve or some other special nerve tissue. Furthermore, the possibilities of developing a general neurotic disturbance as a consequence of a persistent and recurring hyperesthetic rhinitis becomes evident to many physicians who suffer themselves from this malady. So I do not hesitate in saying that the general neurotic manifestation, so evident in many of these sufferers, is the offspring and not the parent of this disorder.

With the susceptibility established, the second element, in the form of an external excitant, like dust, pollen, a draught, bright light, cold, pressure spots within the nose, etc., readily completes the circuit, and the disorder is manifest. Eliminate either one of these two elements, and the syndrome of symptoms so characteristic of this affection is prevented.

The second or exciting element must not necessarily enter the nostrils to set up an irritation. Any place where there are branches and terminal filaments of the great fifth nerve may be the sensitive area. A bright ray of light entering the eye may irritate an individual with hyperesthetic ciliary nerve filaments and precipitate reflex symptoms in the nose. A draft of air from an open window or door, or from an electric fan may irritate the terminal filaments that go to the side or back of the head, and there immediately results these same reflex symptoms. In another individual some of the terminal branches of this nerve within the nose constitute the hyperesthetic area, and an irritant applied there, like a septal ridge, dust or pollen, calls forth symptoms of the disorder. Owing to the nose furnishing the greatest area for the distribution of the filaments of the first two trunks of the trigeminal nerve, it is here we most commonly find areas of irritation.

If in a patient subject to this disorder we subject that particular branch or filament of his fifth nerve to irritation, we produce experimentally all the symptoms of the disorder, irrespective of place or season. I have already shown this in the experiments made in 1904 with the toxin of rye pollen, and reported in a communication read before the Chicago Medical Society , February 22nd, 1905 (published in *Medicine*, April, 1905).

Aschenbrandt, in 1885, showed by his experiments the susceptibility of the fifth nerve to irritation. He exposed in animals the spheno-palatin ganglion, and by electrical stimulation observed

pronounced swelling of the cavernous tissue of the turbinals, with hypersecretion.

Treatment: In the treatment of these cases our first thought must be directed towards the cause of the patient's susceptibility. From my prefatory remarks, it will be seen that this cause resides within the fluids of the body, hence our search for the particular condition that has brought about the individual's susceptibility must necessarily partake of both physical and laboratory examinations. The condition of the gastro-intestinal tract, with its dependent organs, must be investigated; the blood and urine examined, not only once, but several times. As all this demands considerable time, the information should be obtained somewhat in advance of the usual periods of attacks. Having thus before us an average analysis of the patient's condition, we may direct our treatment intelligently in the direction for the correction of any gross deflection from the normal. In some cases the acidosis will demand an antacid, like carbonate of lithium or bicarbonate of sodium. Faulty assimilation and elimination must be corrected by a regulated diet, proper hygienic surroundings and a sufficient amount of exercise in the open, as well as by the aid of a few well chosen drugs. As an eliminant I consider sal-hepatica both agreeable and efficient. It is claimed to contain, in addition to the salts found in the European "bitter waters," lithia and phosphate of sodium. Bishop's practice of administering acids early in the morning and at night, in order to lessen the alkalinity of the blood, thereby freeing it from uric acid, is good practice, and of benefit in those cases where the nerve susceptibility is caused by an excess or the retention of uric acid. During an attack I have secured the most satisfactory results from the employment of a tablet of morphine and atropine. Bishop's formula contains 1-12 gr. of the former and 1-600 gr. of the latter drug, in addition to 1-6 gr. caffeine.

The second part of the treatment is concerned in eliminating the external irritating element or prohibiting its perception. As already pointed out, the causes at work here vary even more than those concerned in the predisposition.

The exclusion of the irritant, if it be dust, pollen, etc., by the use of nasal filters or change of habita, is beneficial in selected cases. The correction of irritating intra-nasal causes should be undertaken where indicated. The topical application to the nasal mucous membrane of remedies capable of relieving the unusual

sensitiveness of its nerves is admissible when properly selected and applied. There are two classes of remedies used here: those producing a hyper-irritating or caustic effect, like formalin, chromic acid, chloracetic acid and electro-cautery, and those producing an anesthetic and ischemic effect, like cocain and adrenalin preparations, and intraneural injections. It is of this latter method I wish to speak particularly.

Intraneural injections have already been used for the purpose of anesthetizing a field for operation, and they have also been employed in the treatment of neuralgia; but, as far as I am aware, they have never been employed in the treatment of hyperesthetic rhinitis until I made my first injection about a year ago (1906). I have used alcohol for this purpose, following the suggestions of Schlosser in the treatment of neuralgia.

In order to prevent the action of most of the external irritating elements, it is essential to the success of this form of treatment to inject the nerves as near their central ends as is consistent with safety and accessibility. This can be done in most cases within the nose. By referring briefly to the distribution of the fifth nerve, the various avenues open to irritation and their approach for the purpose of injection can more readily be understood.

The nose and its sinuses are supplied with sensation through the medium of the great fifth or trigeminal nerve, or more specifically speaking, through its first and second trunks.

This nerve supply is best grouped into an anterior and a posterior group. The anterior group is represented by the nasal nerve, a branch from the first trunk of the fifth nerve, or the ophthalmic. This branch arises from the ophthalmic trunk just at the entrance of the sphenoidal fissure. It passes from the outer side of the orbit beneath the external rectus, diagonally forward and across this cavity to the inner wall beneath the superior oblique, where it enters a small opening in the os planum known as the anterior ethmoidal foramen, and is thus in the ethmoidal labyrinth, supplying this area as well as the frontal sinus by ethmoidal branches. In leaving the territory of the ethmoidal cells it passes upward and again enters the cranial cavity at the outer side of the cribriform plate, running forward to the side and base of the crista galli, where it enters one of the anterior cribriform perforations and passes down into the nasal cavity. Its point of entrance into this cavity is at the extreme anterior-superior angle, dividing here into a septal and an external branch. The septal branch passes down-

ward and forward over the anterior part of the septum, its filaments supplying the anterior portion of the perpendicular plate and quadrangular cartilage. The external branch passes downward in a groove on the underside of the nasal bone, its various filaments supplying the anterior part of the middle and lower turbinal with their neighboring wall and the nasal vestibule. The terminal filaments of this branch leave the interior of the nose between the end of the nasal bone and the superior lateral cartilage, supplying sensation to the ala, tip and bridge of the nose and also the area of the eyebrow and frontal sinus.

The posterior group arises from the spheno-palatine ganglion, and it consists of four sets of nerves. The first is the *naso-palatine nerve,* which arises directly from the ganglion and passes through the spheno-palatine foramen with the other of the posterior group, inward and downward, crossing the anterior surface of the sphenoid sinus just below its ostium and on to the septum; it then passes obliquely downward and forward in a groove on the surface of the vomer just below its upper edge, enters the anterior palatine foramen and then passes through a canal situated in the intermaxillary suture, distributing its terminal filaments to the gum and palate.

The second set are the *superior nasal branches,* which, arising directly from the ganglion, pass through the spheno-palatine foramen into the upper and back part of the nasal cavity. They then pass forward to the mucous membrane of the spheno-ethmoidal fossa, the superior and middle turbinals and a few filaments to the posterior ethmoidal cells and maxillary antrum.

The third set are the *inferior nasal branches,* which are offshoots from the anterior palatine branch of the ganglion. They pass from the palatine canal through openings in the palate bone, and supply the middle and lower meati and lower turbinal.

The fourth set is the *sphenoidal branch,* arising from the vidian shortly after its origin from the ganglion, and supplies sensation to the sphenoid sinus.

In addition to the superior nasal branches the maxillary antrum is supplied by branches from the posterior-dental, which comes from the superior-maxillary root after the formation of the ganglion.

Within the orbit the nasal nerve gives off several small branches, one going to the ciliary ganglion, called the ganglionic, two or three supplying the ciliary muscle and iris, called the long ciliary,

and one to the inner angle of the eye and side of the nose, called the infra-trochlear.

The frontal nerve or main branch of the ophthalmic root is known towards its terminus as the supra-orbital, being distributed to the upper eyelid, brow, forehead and parietal region.

The lachrymal branch of the ophthalmic supplies its gland and also the upper eyelid.

These latter nerves are mentioned in order to show the wide field subject to reflex disturbances.

That the branches of these two great nerve roots may represent the hypersensitive area seems to be shown in the relief afforded certain patients after intra-nasal operation and treatment. But in the removal of a spur or the cauterization of a turbinal, or after irrigation of a sinus, only a few of the many nerve filaments within the nose are reached, and that is why the results following many such operations prove of but partial or no benefit. If in addition attention were given to the entrance of the nose, through which many irritating causes find their way, no doubt many more cases would be relieved. Upon this principle is based the value of the small nasal filter, consisting of a piece of fine mesh fabric enclosed in a metal frame and inserted just within the nostrils, thereby filtering the inspired air of almost all irritating matter, although it will not keep out irritating vapors, gases or odors which may be the cause of precipitating an attack as readily as dust or pollen. But the irritating cause may be directed to the external terminal filaments of the nasal nerve which go to the forehead, brow and exterior of the nose, and in order to relieve these filaments of their hypersensibility, something more than filters, cauterization of the turbinals, the removal of ridges and the like becomes necessary. By injecting the nasal nerve at its point of entrance into the nose, we deprive both its internal and external filaments of their hypersensibility. If we are to afford immunity to all cases of this disorder, it will be necessary to inhibit the action of the entire nerve supply of the nose, which means anesthetizing both the anterior and posterior group of nerves. This is easily done by selecting the proper length and curve of hypodermic needle and introducing it into the neighborhood of these nerves as they enter the nose. In the case of the nasal nerve, a needle two and one-half inches long is required, whose point is entered at the anterior-superior angle of the nasal cavity, against the inner surface of the nasal bone, and near its distal end. The

posterior group of nerves is reached by a needle three and one-fourth inches long with a curve near its end of 45 degrees. This is entered in the neighborhood of the spheno-palatine foramen, which is located in the spheno-ethmoidal fossa, just above and to the outer side of the posterior end of the middle turbinal. Both nostrils are injected, requiring four injections, two for the anterior and two for the posterior groups. In some cases it may be necessary to inject only the anterior groups. Both dilute and pure alcohol has been used by me for injection, using only a few drops in each injection.

The injections are made painless by a preliminary application of a cocaine solution. No serious ill results have been encountered. I have found that the injections had to be repeated from one to four times, covering the season of attack.

It would appear from a study of the distribution of the fifth nerve that, in a few cases, we still fall short of depriving all of its filaments of their hypersensibility, unless we make our injections central to the off-shoot of the ethmoidal branches. These branches supply the anterior ethmoidal cells, and the frontal sinus, and hence the nasal nerve would have to be reached from within the orbit, just as it enters the ethmoidal foramen. Experiments on the cadaver show this to be an easy procedure by means of a fine hypodermic needle two inches long introduced at the upper angle of the orbit and carefully hugging the bone.

As yet the work carried out by me along these lines has been mainly experimental, and a sufficient number of cases have not been under observation long enough to make this report more than preliminary. But I think with the aid of other workers along this line a most rational mode of treatment may ultimately result from this procedure.

100 State Street.

PHYSIOLOGIC HEARING TESTS.

BY THOMAS M. STEWART, M. D., CINCINNATI, OHIO.

In the course of the writing of this paper, the necessity arose for making a comparative physical examination of several different makes of tuning forks. Three different makes were examined.

The forks usually sold to the aurist are five in number, almost all of them marked as follows:

C of 128 double vibrations per second.
C^1 of 256 double vibrations per second.
C^2 of 512 double vibrations per second.
C^3 of 1024 double vibrations per second.
C^4 of 2048 double vibrations per second.

In different makes these forks vary considerably. Of the two sets examined by me and marked as just indicated, I found,

C of both makes, very close.
C^1 of one make lower than C^1 of the other make.
C^2 of one make higher than C^2 of the other make.
C^3 of one make higher than C^3 of the other make.
C^4 of one make lower than C^4 of the other make.

The third set of forks, Ferguson make, were marked:

50 double vibrations per second.
100 double vibrations per second.
200 double vibrations per second.
500 double vibrations per second.
2000 double vibrations per second.

They were tested by the method of sound reinforcement, and the calculations made to determine the number of vibrations per second in relation to their wave lengths and the velocity of sound in the air, at the temperature of the air in the testing tube.

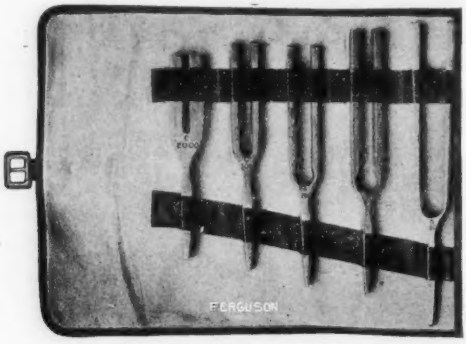
The standardized forks of the University of Cincinnati were used in the examination of the two sets of forks first referred to, and the tests checked by the reinforcement method. But with the Ferguson fork, the standardized fork could not be used, because they were all single vibration and marked in the usual way.

The test with the siren was omitted, because accuracy with it, depends upon long practice to secure the skill necessary to run it at the same speed twice in succession. To obviate this, I

am having made parts of an apparatus to carry out the siren principle, so that all the elements of known and controllable speed, constant air current, and sound vibration, may be relied upon.

Sufficient facts were brought out to show that the physical differences in the various tuning forks must be taken into account in their clinical use.

Taking the Ferguson fork of 100 D. V. per second and comparing it with the 128 of the two other makes, a noticeable difference in the relative aerial and bone conduction was apparent. This is due to the Ferguson forks being better balanced, because designed by Dr. Randall of Philadelphia, for ear work, and comparative clinical tests prove that forks modeled on the plan of the chro-



matic scale, may be improved upon for diagnostic and prognostic aural purposes.

The best assortment of forks for aural purposes may be described as follows:

The tuning fork of about 50 double vibrations per second is valuable in testing *early* obstructive deafness. It is *not* heard aerially by very many whose deafness is beginning; but very audible to many decidedly deaf to high tones through internal ear lesions.

The fork of 100 double vibrations can be heard by almost every one, unless the deafness is *pronounced,* and this too independent of the location and nature of their lesions.

A fork of about 200 vibrations and the one of 500 vibrations will be referred to in the making of the Rinné test, the former for patients over forty and the latter for patients under forty.

For testing the integrity of the internal ear, a fork of 2000 vibrations is better than any lower tone, because if a lesion exists, this fork is more apt to be badly heard or not heard at all.

The Galton whistle, accurately made (Edelmann of Munich makes the best one) will give vibrations from 4000 to 40,000, depending upon the adjustment made. This test enables us to learn the condition of the auditory nerve, by determining the range of high note perception. Beginning with the highest limit of Galton's whistle, the scale is gradually descended until a tone is reached that is perceived by the patient.

These tests can all be made in a comparatively short time, and a brief record can be made of what *is* discovered, so that no barrier need stand in the way of making the tests and the record.

With the proper equipment, the examination can be made in less time than that required for an ordinary case of refraction. The excluding from treatment of those cases in which the examination indicates a bad prognosis will redound to the credit of the aurist, and the satisfaction of knowing what chances the patient may have for more or less favorable results from treatment is worth the effort.

Certain physiological tests can be used to arrive at a differential diagnosis of ear lesions, and at the same time give valuable information on which to base a prognosis in those cases showing deafness and tinnitus aurium.

As the loss of hearing and the annoyance from tinnitus are more pronounced when the lesion is in the middle ear or labyrinth, nothing will be said in this article concerning the more external troubles, foreign bodies, small perforations in the ear drum, etc. It is taken for granted that such lesions, if present, have been duly accounted for.

Experimentally, affections of the drum head, such as perforations, cicatrices and calcareous deposits, cause less deafness than do anchylosis of the chain of bones, or adhesions of the drum to the promontory. The tuning fork tests will show a decided loss of power to hear low tones in obstructive deafness.

By the appearance of the drum head, and the degree of permeability of the Eustachian tube, the state of the mucosa, tympanic and tubal, is determined. The more serious the involvement, the more pronounced the deafness and tinnitus. In slighter degree of inflammation, these symptoms are less pronounced and yield readily to treatment. The ability to hear best in a noise (paracusis Willi-

sii) is a very constant sign of bony anchylosis or sclerotic changes in the mucosa.

WATCH TEST OF FUNCTIONAL POWER OF TENSOR TYMPANI AND STAPEDIUS MUSCLES.

Middle ear inflammation may cause loss of power in the tensor tympani and stapedius muscles, or sclerotic changes and adhesions may interfere with their action. General, systemic or nervous conditions may be a fault to correct, as regards the proper action of these ear muscles. Their function is to regulate the tension of the drum head, and control the intra-labyrinthine fluid pressure, hence their importance to good hearing. They have been likened to the ciliary muscle of the eye, in that they "focus" the sounds in a "mixed" noise and enable us to hear that which we fix the attention upon.

The watch test is made for the purpose of determining their tonicity. One ear of the patient is stopped by a folded towel pressed *around* the auricle, the watch is gradually brought toward the uncovered ear, and the distance recorded after several tests; then the reverse test is made, gradually carrying the watch *away* from the ear and noting the distance to see if he is able to hear it at a greater distance than when approached.

The normal ear will hear the watch further away when approached, but if the tensor tympani and stapedius muscles are weakened it will not be heard at a greater distance as the watch is withdrawn as compared with the first test of gradually approaching the ear with it.

The "focusing" power enables the hearer to select independently certain sounds he wishes to hear. Hence loud ticking watches of noticeably different tones may be used in the effort to have the patient hear either one at will. The normal muscle power will enable the patient to do this; but if these ear muscles are impaired only confusion of noises will be heard.

PROGNOSIS TEST.

Deafness and tinnitus, dependent upon loss of mobility in the chain of bones, call for careful and discriminative examination, not for the purpose of outlining treatment so much as the question of the probability of cure or improvement.

We shall endeavor to systematize this most difficult field of differential diagnosis, because of the fact that some otologists of

high attainment, condemn or belittle the physiologic tests of hearing as of doubtful value. Many others depend upon these tests to decide the prognosis, and therefore whether or not the case be taken for treatment.

Jankau, of Zurich, gave an example of indefatigable energy in pursuing the subject of differential diagnosis of the more serious forms of deafness and tinnitus, that the critic of these methods would do well to imitate in the effort to establish the truth, rather than to simply destroy for the sake of some weak points in the presentation of the matter in the inadequate channels of society papers and discussions. Valuable methods in most instances, but not always equal to the personal experience with the tests made systematically, with the aid of the best instruments and for the purpose of prognosis.

TUNING FORK PRINCIPLES.

(a) The normal ear hears the tuning fork about twice as long by air conduction as compared with bone conduction. But age reduces bone conduction, perceptibly so, after the fiftieth year.

(b) Loss of mobility or any lesion of the conducting apparatus increases the intensity and duration of bone conduction; and hearing for low tones is diminished, or it may be lost.

(c) Disturbances in the perceptive apparatus, decreases the duration and intensity of hearing by bone conduction; and hearing for high tones is diminished or lost.

To explain the "why" of these phenomena has led to the advancement of many ingenious theories, the discussion of which often clouds the practical value of the tests as we use and know them.

TUNING FORK PROCEDURE.

Air conduction is first tested, the fork being thrown into vibration by falling through the arc described by placing the handle on the thigh and allowing the fork to strike by its own weight (occlude the ear not under test). For patients under forty a C^2 or 512 vibration fork is best. Those over forty use the C^1 or 256 vibration, i. e., middle C of music. The duration of hearing is noted, then without again striking it, note if any vibration is heard by bone conduction, but occlude the ear under test for bone conduction. The Weber test may then follow, occluding both ears by towels held against the auricles, because in this way the patient

is enabled to detect hearing power in the affected ear, a thing he might *not believe* if the tests are reversed.

Politzer's test with tuning fork vibrating before the nostrils should disclose greater hearing power at the instant of swallowing, if the Eustachian tubes are patulous and no labyrinthine involvement is present. It is well to re-test aerial and bone conduction after inflation in any doubtful case.

It is well then, to test the duration of aerial and the duration of bone conduction separately with a fork that a healthy ear can hear for at least fifteen seconds. Because to *establish the fact* of an unhealthy internal ear by diminished bone conduction, or a healthy internal ear by increased bone conduction, is a distinct aid in the further examination and prognosis of the case. *All* the fine points need not be elaborated here, but increased bone conduction excludes the existence of deafness due to obstruction in canal. Eustachian tube, etc. The latter may be present in conjunction with disease of the internal ear, constituting a "mixed" deafness.

The watch test for reasons already given, and the duration in seconds of bone conduction, thus furnish diagnostic valuable aid, prior to direct observation; but the use of tuning forks of various vibrations have an added value in *prognosis.*

605 Traction Building.

A Foreign Body in the Larynx. E. BERGH. *Monatsschrift fur Ohrenheilkunde*, Oct. 1905.

An elderly man who for years had worn a hard rubber plate to cover a perforation in the hard palate resulting from an old tertiary lesion, stated that he had swallowed the plate and shortly thereafter had become hoarse. He had no pain or difficulty in swallowing. The author found a large ulcer on the left side of the larynx, with sharply cut, undermined edges, a smooth greyish base, extending over the entire side of the larynx. He regarded it as a tertiary lesion. After a few days what appeared to be a piece of cartilage was found to project from one side of the ulcer. Upon seizing this with forceps, he extracted the hard rubber plate, the surface of which was encrusted with lime, salts and dried mucus.

YANKAUER.

THE CLIMATE OF COLORADO ETIOLOGICALLY AND THERAPEUTICALLY CONSIDERED.*

BY JAMES ALLEN PATTERSON, M. D., COLORADO SPRINGS, COLO.

The consideration of the various influences of the climate of Colorado upon the catarrhal condition of the upper air tract cannot be considered rationally without first briefly alluding to its varied physical geography. A state with an area of 103,925 square miles with watersheds running in diverse directions, altitudes varying from 4,000 feet to forty mountain peaks over 14,000 feet and fifty over 13,000 feet, naturally presents different characteristics.

What we term the western slope from the great continental divide in the neighborhood of Leadville at 10,500 feet to the Utah state line where the elevation lessens to 4,500 feet, presents a climate characterized by much snow in winter and in summer, heat distinctly above temperate. In this belt, in the valleys, sugar beet growing and fruit raising are carried on to great profit. On the eastern side of this slope when the higher mountain ranges are left behind, the climate is characterized by winters less severe with less snow and less rainfall and by summer nights too cool to foster the agricultural pursuits of the region just mentioned. Then as we go farther east or north and get away from the mountain influences, greater warmth in summer is encountered fostering, where water is available for irrigation purposes, productive agricultural pursuits.

The climate which is usually had in view when that of this state is mentioned in connection with the cure of tuberculosis, is that of this eastern slope in the foot-hills of the Rocky Mountains not far enough away to get the heat in summer, the cold in winter nor the atmospheric moisture of the states which border it on the east

In tubercular affections, I am impressed first by the importance of the climatic influence upon the laryngeal manifestation. I shall never forget the fear in attempting the control and betterment of laryngeal tuberculosis engendered by experiences on the eastern seaboard that assailed me in beginning work in this line in Colorado, but I will remember the surprise that awaited

*Read before the American Laryngological, Rhinological and Otological Society, Pittsburgh, Pa., May 28-30, 1908.

me as a result of my efforts. I began seeing cases that I should have considered utterly hopeless, improving under methods that were futile elsewhere. I recall a case that presented the typical pyriform-shaped swelling of the arytenoids, hoarseness and much cough, go out of my observation for four of five weeks to sojourn upon a ranch in mid-winter where the food was supposed to be poor as well as plain, where one could live in only comparative comfort, where fortunately there was nothing to do but sit along the "sunny side of the barn," eat when food was served and sleep when the sun set. This person returned at the end of the period mentioned with arytenoid cartilages of normal contour, only some catarrhal laryngitis remaining. He is practicing his profession to-day—some eight years since. Yet I do not want you to deduce that our climate has an effect upon the larynx only; there may be a few exceptions to the rule, that laryngeal tuberculosis improves in more or less ratio to the general improvement of the patient's condition. When the patient is able to support the tubercular invasion which is aided by climate and hygiene, our well accepted methods of dealing with tuberculosis of the larynx are surely much enhanced.

Tubercular diseases of the middle ear as evidenced by breaking down of the drum membrane with little inflammatory or sensory symptoms are more apt to become quiescent, less liable to dangerous outbursts than elsewhere; and upon the improvement of the patient's general health or stay of his disease, the ears usually become free from discharge. Tuberculosis of the pharynx and mouth are so surely manfestations of the last stage of the disease that they are mentioned only to indicate the bad prognosis.

The influence of the dry air of Colorado upon catarrhal condition of the upper air passages is more difficult to summarize than its influence upon tubercular conditions.

Hypertrophic nasal catarrhs with more or less nasal stenosis are distinctly benefited. Where there is abundant secretion it is usually lessened so quickly on one's advent that a preliminary dryness as pointed out by the late Dr. Solly, with probably a little blood stain when the nose is blown, is frequently met with and leads the patient to very erroneous conclusions regarding his affection, in fact a great deal of the mild nose-bleed which the laity attribute to high altitudes is simply due to inspissated mucus within the nasal vestibule that is picked off roughly until the mucous mem-

brane is abraded and bleeds under a very slight irritation such as the blowing of the nose.

Those who suffer from true hay fever in other and damper climates are frequently absolutely relieved. I can attest personally to my own perfect cure of it since residing in Colorado Springs. Paradoxically there are found old residents who have developed hay fever in Colorado who do not have it in damp climates.

Atrophic rhinitis and its sometime accompaniment atrophic pharyngitis being dependent upon diverse causes is susceptible of so many classifications that I approach the subject with diffidence. I shall exclude ozaena. I commonly meet it as a very mild form of rhinitis sicca with sensations of annoyance far out of proportion to the variation from normal appearances. I have never seen this form progress unfavorably, though it is very rebellious to treatment except where it has been caused by irregularities of the septum, turbinal occlusions, or enlarged tonsils; in the latter cases great relief is obtained by operative procedures. These rebellious cases are usually found in lithaemic individuals and seem to be aggravated by the rapid evaporation of moisture in the anterior third of the nostril, which takes place in dry atmosphere. Such cases are distinctly more comfortable in moist climates.

Perforations of the septal cartilage, particularly where there is a deflection with occlusion, are more apt to occur than in damp regions; also septal deviations, encroaching upon the vestibule, are usually more apt to give annoyance than they do in moist zones.

Catarrhs of the Eustachian orifice, when due to hypertrophic rhinitis, are benefited; but since most of such cases are complicated with deflected septae, enlarged tonsils or even adenoids, operative measures are imperative.

I have been unable to formulate any rule to apply to the cases of chronic middle ear catarrh; I meet cases where the presence of tenacious mucus in the tube is most obstinate even where there is little abnormality of shape or where there is very little alteration in the secretion as evidenced by the appearance of the nose and nose pharynx. Many of these cases are benefited when coming from moist climes. My observation of the effect of treatment upon such conditions originating in Colorado shows about the same degree of stubbornness everywhere encountered. I feel, however, that such cases developing in moist climes are benefited. Some of those developing in Colorado may be improved elsewhere, yet

most of the cases that I have sent away have returned showing no benefit.

Cases are seen of chronic suppurative otitis media that come to Colorado, of their own accord, yearly, because they find the discharge lessens and their general condition is greatly improved by doing so.

My experience has been when operative measures are undertaken upon such cases that post-operative healing is unusually rapid. The deduction is therefore obvious. This is simply in accord with a statement made by Solly in 1903 that "with regard to surgical cases treated at an altitude, nasal or otherwise, it is undoubtedly true that they do better and require less post-operative care than at a low level."

805 North Tejon Street.

Disturbances of Taste in Chronic Middle Ear Suppuration.

LUDWIG KANDER. *Archiv fur Ohrenheilkunde*, May 1906.

After a critical review of the subject and a report of a number of illustrative cases, the author arrives at the following conclusions:

The chorda tympani is the nerve of taste for the anterior two-thirds of the tongue, the tympanic plexus for the posterior third. Complete destruction of these nerves results in a complete loss of the sense of taste, partial destruction, in diminished or delayed sensibility, absence of after-taste, or complete loss of sensation in localized areas. Although the chorda tympani is frequently destroyed in extensive suppuration, especially when associated with cholesteatoma formation, it may remain intact even when the suppuration is severe. The tympanic plexus may be likewise affected. During ossiculectomy or the radical operation, the chorda tympani is regularly destroyed, the tympanic plexus occasionally. Disturbances of taste after these operations are permanent, subjective sensations which occasionally are observed being due to irritation of the central stump of the nerve. The plexus and the chorda do not contain tactile fibres, but loss of tactile sensation in the tongue may be secondary to the loss of the sense of taste. The electric current does not cause a sensation of taste except in those areas in which other substances cause such sensation. YANKAUER.

THE CLIMATE OF THE NORTH AND NORTHWEST IN ITS ETIOLOGIC AND THERAPEUTIC RELATION TO DISEASES OF THE NOSE, THROAT AND EAR.*

BY CHARLES NELSON SPRATT, B. S., MINNEAPOLIS, MINN.

"The climate of a region or site is the combined effect of the atmosphere and of the nature of the surface, in their relation to man." The weather is merely a phase of the climate, changeable from day to day.

The atmosphere varies in chemical composition, in temperature, in pressure, humidity, diathermancy, transparency, dust electrical conditions, and in the force and direction of the winds. Other factors are latitude, altitude, relations to large bodies of water, deserts, etc., nature of the soil, surface, i. e. slopes, plains valleys, etc., cultivation of the soil, drainage, manufactories and density of population.

The untutored savage has always looked upon the natural phenomena with awe and reverence. It is not strange that to-day certain individuals hold the climate responsible for their aches and pains. They likewise think of some climate, other than their own, generally those described by railroad circulars, as the panacea for all their troubles.

As knowledge replaces theories, the direct influence of climate in the etiology and treatment of disease, becomes less prominent.

Twenty years ago malaria was considered to be a direct result of climate. A certain "miasma" arising from swamps was thought to be the cause of the disease. We now know that malaria is due to a protozoon transmitted to man by the mosquito. Until recent years yellow fever and the "sleeping sickness" were considered to be in some way caused by the tropical climate. Reed, Lazear and Carroll demonstrated beyond doubt, that the infection of yellow fever is likewise transmitted to man by the mosquito. Koch has recently shown that the sleeping sickness of Africa belongs in the same group. The hot climate offers conditions favorable for the existence and spread of these diseases. Typhoid fever, influenza, pneumonia and many other diseases formerly considered to be due to climate, are now known to be caused by bacteria.

*Read before the American Laryngological, Rhinological and Otological Society, Pittsburgh, Pa., May 28-30, 1908.

Although man can exist in any climate, hot or cold, moist or dry, high or low, where food is sufficient to support life, or the natural enemies are not too numerous, his physical, mental and moral make-up are influenced by the external conditions.

Experimental work on animals has shown that chilling, either by ether spray, or dipping into ice water, is generally followed by cloudy swelling, and granular degeneration of the hepatic and renal cells, with fever and albuminaria. While these experiments are not applicable to man, they show that excessive changes in temperature will cause, at least in animals, pathologic conditions. Lode found that animals chilled by wetting the fur more readily succumbed to infections. This may explain why pneumonia, rhinitis, and other acute inflammations of the respiratory tract, that so frequently follow a chilling of the body, are due to infection following a lowering of the resistance.

The climate of the north and northwestern part of the United States, east of the Rocky Mountains, would be classed, according to Koppen, as a cool temperate climate, i. e. monthly averages above 68° F. are limited to the summer months.

In such a vast territory, extending nearly 2000 miles from east to west, and 500 miles from north to south, with the same general climate there are many variations. In a paper limited as to time, it will be impossible to speak more than in general terms of these minor differences in climate. The climate of a certain locality is often quite different from regions only a few miles distant. A southern exposure is generally warmer and more protected from the winds than a northern, valleys are generally damp, the air of the hills and mountains is dry.

The winters of Minnesota and Northern Maine are long and rigorous, the summers short and often sultry. The winters in regions 400 miles south are mild, the summers long and semi-tropical.

The mountain ranges along the Atlantic coast offer a cooler and drier climate than regions near the ocean.

The amount of sunshine, in different portions of the North, varies considerably. In the winter of 1901 at Buffalo, New York, there were 56 cloudy, 34 partly cloudy and no clear days, while at Atlantic City there were 22 cloudy, 32 partly cloudy and 26 clear days. In general, along the Atlantic coast, the sunshine increases as we go south and the fog becomes less.

The prevailing winds are from the Northwest and South. The former are dry, the moisture having been precipitated on the western slope of the Cascade Mountains. The moist south winds, a part of the trade winds, travel from the Gulf up the Mississippi Valley. The New England coast in the winter time is often swept by cold damp gales from the North and Northeast. Fogs so frequent along the Atlantic coast are rare in the Northwest.

The so-called dry steady winters of the Northwest show as great a daily range of temperature as in the East, but it is less noticeable to the individual. A drop of 20° in temperature, from 50° to 30° F., is more noticeable than an equal change of temperature from 20° to zero.

The humidity varies considerably, being greater near large bodies of water. The climate of the Northwest has for a long time enjoyed the reputation of being dry. This, according to weather reports, is more apparent than real. Owing to the lower temperature, the absolute humidity of the Northwest is less than the Eastern States. The mean relative humidity is about the same as that of the middle Atlantic coast. Below 55° F. the evaporation of cutaneous moisture is so slight that the humidity is not noticeable.

With the exception of the mountains along the eastern coast, the elevation is for the most part under 1000 feet.

It is undoubtedly true that a large percentage of the inhabitants of the northern part of the United States are sufferers from what are commonly grouped under the indefinite but comprehensive term "catarrh." It is well known that acute inflammation of the respiratory tract, the "colds," the "coughs" and the "sore throats" are not as frequent in the summer months as during the rest of the year. Nasal stenosis and excessive secretion are more common in cold weather.

This is due to the extra work thrown on the nose in warming and moistening the cold, dry air. Inturgescence of the turbinates occurs if the nose is narrow or deviations or spurs exist; stenosis results and this is followed by an increase in the amount of nasal discharge.

It is also true that individuals with adenoids, hypertrophied turbinates, chronic pharyngitis and laryngitis, are worse during the winter months. That these diseases of the respiratory tract are not due to cold *per se* seems probable from the fact, that the original inhabitants and early settlers were relatively immune.

A cold climate is bracing and adapted for the maintenance of vigorous health. The activity of the individual is greater, more CO_2 is said to be given off by the lungs and muscular power is increased. With moderate changes in temperature the individual's resistance is increased.

In considering the effects produced by climate, in its relation to disease, we must take into consideration a far more important factor,—the artificial climate. In the northern part of the United States, the individual lives for nearly eight months under the unnatural conditions of this artificial climate. In the East and Central States, five or six months are spent in the natural climate, the remainder in the artificial.

This artificial climate is an outgrowth of our modern civilization. By this I do not refer to the changes produced by the drainage of swamps, the felling of forests, etc., but to certain far more important changes; of these may be mentioned:

First, Crowding.—According to the United States census of 1900, 31.3 per cent. of the total population lived in cities of 8,000 or more. This herding together increases the spread of infection, especially diseases of the respiratory tract. As a rule the denser the population the more unsanitary are the conditions.

Second, Dust.—In the city the pure air of the forest and prairie is replaced by a smoky, filthy, dust laden atmosphere. Dried sputum and excrement from many horses, pulverized by the constant traffic, thrown into the air by street cars and automobiles, is blown into our eyes and nostrils. No window casing is tight enough to keep it out of our buildings. The constant breathing of such dust laden air, even if the bacteria have been killed by the action of the sunlight, must have an irritating effect on the respiratory mucous membrane.

Pneumonia, influenza, and tuberculosis are in many cases dust infections. Could the infection be traced, doubtless acute rhinitis, tonsilitis, conjunctivitis, might be included in the above. Polishers, stone-cutters and grinders, are frequently sacrificed to their occupations, by the constant inhalation of sterile dust.

Health officers say that after a few bright, warm, dry, dusty days, the number of cases of infectious diseases is sure to be increased. The severe influenza epidemic of 1889 followed a mild, open winter and autumn. The same is true of the past winter in the Northwest. There is much truth in "A green Christmas means a fat graveyard."

Third, Overheated buildings.—As has been stated, during six to eight months of the entire year, a large percentage of the population live in a semi-tropical climate. Houses and offices are heated by steam, hot air, etc., until the temperature is 70° F. or over. The humidity in most cases ranges from 5 per cent. to 10 per cent., when it should be 50 per cent. to 70 per cent. In zero weather to give a relative humidity of 65 per cent. would require in the average house with a temperature of 70° F. the evaporation of six gallons of water.

Fourth, Sudden and marked changes in temperature and humidity.—In the natural climate a fall of 20° in temperature as from 70° to 50° F. is very noticeable, an equal fall from 20° F. to zero is not so apparent. Although in the Northwest the changes in temperature are just as marked as along the Atlantic coast, the changes in the winter are not so noticeable on account of the low average thermometer. In the winter months the changes from the hot, dry air of our buildings to that of out-of-doors may range from 30° to 100° F. The suddenness of this change is not to be compared to that of any natural climate. The effect of this change on the respiratory tract, is far more serious and likely to cause irritation than cold.

Fifth, Deficiency of Sunlight.—This is due not only to the thick pall of smoke covering most of our cities, but to the indoor life led by a large proportion of our population. The bactericidal action of light is an important factor in preventing the spread of disease.

Pneumonia, influenza, acute sinusitis, diphtheria, acute otitis media, tonsilitis and probably acute laryngitis, rhinitis and pharygitis, are due to bacterial infection. Sudden changes in temperature, dust, and mouth breathing, lessen the resistance and make infection possible.

Repeated attacks of acute inflammation, especially when the individuals live under unnatural conditions, lead to permanent changes in the tissues. We thus have hypertrophy of the turbinates, adenoids, enlarged tonsils, chronic sinusitis, polypi, and chronic inflammation of the larynx and pharynx. A large percentage of chronic catarrhal otitis media cases are secondary to diseased conditions of the nose and naso-pharynx. The tinnitus accompanying such conditions is in some cases undoubtedly influenced by the atmospheric changes. These cases frequently improve in hearing and the tinnitus ceases after free nasal respiration has been

established by operation. Practically all cases of hypertrophy of the turbinates, adenoids and enlarged tonsils, cases with dry and the secretory form of catarrh of the middle ear are better during the summer months. The cold or rather the sudden changes from hot dry houses to the cold winter and autumn air aggravate the conditions. Patients who go south for the winter find relief.

True hay fever or rose cold, occurring in May and June, is not common in the United States. Our so-called hay fever occurs in the late summer and autumn. There can be but little doubt that in a large percentage of cases the pollen-toxin of the rag-weed or Ambrosia is the exciting factor. Britton and Brown, give the distribution of the genus Ambrosia as follows: From Nova Scotia to Florida west to British Columbia.

In the North the plants are poorly developed and the amount of toxin is less than in those growing farther south. The plants bloom about the twentieth of August in the region about New York City. Sufferers find relief in the mountains and the north shores of the Great Lakes. The disease is rare in the region of Lake Superior.

Tuberculosis of the larynx is a disease practically always secondary to pulmonary tuberculosis. Cures of the latter condition are obtained in almost any climate. A moderately cool, dry climate with much sunshine has a more stimulating effect than a warm climate. Climate plays no role in the etiology of tuberculosis of the larynx. In regard to the treatment, the general resistance must be increased and a mild climate with a dust free air is to be desired.

Acute diseases of the upper air passages are not subject to climatotherapy except as to prophylaxis. The chronic diseases of the upper respiratory tract, as adenoids, hypertrophic rhinitis, inturgescence, etc., cause less disturbance in a mild warm climate, not subject to sudden change.

The climate of the North, while both directly and indirectly being of much importance in the etiology of disease, has but little value in the treatment.

Conclusions—

First. The influence of climate in the etiology and treatment of disease has been over-estimated.

Second. Acute and chronic inflammation of the respiratory tracts are more frequent and worse during the winter months.

Third. These conditions are not due to cold but to certain artificial conditions under which the individual lives from six to eight months,—the artificial climate. This includes crowding, dust, over heated rooms with dry air, sudden changes from heated rooms to the cold outside air and deficiency of sunlight.

Fourth. Diseases of the ear, nose and throat are common in the North, due to the above conditions.

310 Syndicate Arcade

A Case of Primary Bilateral Mastoiditis. P. G. GOLDSMITH, M.D. *Montreal Med. Journal*, Oct. 1907.

Following Grippe, pain in vertex and along posterior auricular with tenderness of posterior cartilaginous walls of both ears were noted. Hearing and membranes normal. Swelling of walls of external auditory canal quickly ensued with mastoid tenderness. Both mastoids were opened, existing disease with pus containing pneumococci was found. WISHART.

Motor Paralysis of the Superior Laryngeal Nerve. E. KRONENBERG. *Monatsschritt fur Ohrenheilkunde*, Oct. 1905.

In this interesting and unusual case the paralysis of the motor branch of the superior laryngeal nerve was caused by the pressure of a tumor upon the side of the thyroid cartilage. There was no sensory disturbance in the larynx, no paralysis of the epiglottis. The voice was peculiarly deep and creaky; high notes could not be produced. The vocal cords were slightly reddened, the paralysed cord being situated lower down in the larynx than the normal cord. Occasionally the paralysed cord was shorter and bowed outwards, but this condition was not constant. The author believes this was due to a temporary paresis of the thyro-arytenoideus internus. The case was not under observation long enough to determine the effect of the removal of the tumor upon the paralysis.

YANKAUER.

THE HEADACHE OF NON-SUPPURATIVE FRONTAL SINUITIS.*

BY FRANK BRAWLEY, M. D., CHICAGO.

I wish to present the history of a very interesting case illustrating the headache of non-suppurative frontal sinuitis. This condition I consider to be a distinct clinical entity, which is as susceptible of accurate identification as any microscopical specimen can possibly be. My first reports upon this condition were made before the Chicago Ophthalmological Society, and the Ophthalmic Section of the American Medical Association, as these cases most frequently consult the ophthalmologist because of the marked eye symptoms which are always present.

The literature presents only two cases which seem to belong to this particular class. Robertson reports one case briefly in the *Journal of the American Medical Association* of March 5th, 1904, and Ewing and Sluder also report a similar case in the Transactions American Ophthalmological Society, May, 1900.

We find the region of the middle turbinate body usually normal in appearance, although one looking for a possible nasal origin of an intractable headache would note the close approximation of the middle turbinal to the lateral nasal wall. This condition causes a blocking of the fronto-nasal duct upon slight turgescence of the turbinal, so that we get a history of unilateral pain coming on in damp, chilly weather, with colds at the menstrual period, etc.; in short, whenever nasal congestion occurs.

With the duct blocked no air can enter to replace the oxygen, which is rapidly absorbed in the lining sinus membrane. A vacuum results with consequent swelling of this lining membrane and irritation of the fibers of the anterior nasal nerve producing a headache in the region of the distribution of this nerve, namely, the orbit, frontal sinus and anterior portion of the nose.

If the patient is seen during a headache he may usually be relieved by applying suprarenalin 1-1000 or cocain two per cent. to four per cent. under the tip of the corresponding middle turbinal, thus restoring the free interchange of air between the nose and frontal sinus. This is proof positive that the obstruction was the

*Read before the meeting of the Chicago Laryngological and Otological Society, April 14, 1908.

cause of the headache and the anterior third of the turbinal may be resected, usually with permanent relief. In the event that the patient cannot conveniently be seen during an attack, the headache may be artificially produced by means of the suction pump which I have adapted for the diagnosis and treatment of suppurative nasal accessory sinus disease.

The history is as follows: August 16, 1907, Mrs. R. D. consulted Dr. Casey Wood on account of persistent headaches about the right eye. She had been repeatedly examined in a general way with negative findings and had been referred to Dr. Wood by Dr. Peterson of Ann Arbor, after he had failed to find any pelvic trouble. As a child she suffered from photophobia. No lid or extra-ocular muscle symptoms. The chief symptoms began ten years ago, and have been present in attacks two to four times a month and invariably at her menstrual period.

The pain usually begins at 4 a. m. and is located in the left eyeball. By 7 a. m. nausea begins, followed by vomiting which continues for one or two days, usually ceasing at sundown of the second day. During the attack the left eye is bloodshot and pain is increased by movement of the head. The attacks at the menstrual period are always the most severe, those occurring in the intervals being much milder.

Glasses had been worn without relief. I found under atropia one diopter of hypermetropic astigmatism, axis 145 which was ordered. A headache of the typical form was produced by the suction pump used for ten minutes and was very severe during the following night. It was relieved next morning by the cocain and suprarenalin application under the middle turbinal. I then resected the tip of the middle turbinal and patient went to her home in northern Michigan before complete healing had taken place.

The attacks were much less frequent and severe for a month or two and then became as bad as ever, in spite of the attempts of her physician to probe the frontal nasal duct. She reported to me on March 10, 1908. The lower end of the fronto-nasal duct was partially occluded with thickened mucous membrane and the sinus could not be entered with a probe. The duct was cauterized as far as possible with trichlor-acetic acid. This was repeated on the next day. On the third day I was able to pass the probe into the frontal sinus and I then cauterized the entire duct with a bead of chromic acid fused on a probe bent to the proper curve to enter the sinus. I

followed this by passing the probe daily and by gentle curettage with a bent applicator thinly wrapped with cotton. During this time the menstrual flow appeared and passed away without a symptom of the old severe headache for the first time in ten years. Forty minutes' suction treatment did not produce any pain, whereas the first trial had produced a most severe attack after ten minutes' use. These tests would seem to prove conclusively that the condition has been satisfactorily dealt with, but the test of time of course remains.

72 East Madison Street.

Primary Melanosis of the Palate: Naso-Buccal Fistula of Recent Sarcomatous Origin. J. N. Roy, M. D. *Medical Record*, Nov. 2, 1902.

The physiology of animals is capricious, but with man melanosis of the palate has always a serious signification; either it is a percursory symptom of future disease, or it is a complication of an already existing tumor, or else it begins with the new growth.

A very complete history (with plates) extending over ten years, with a possible connection with an injury to the palate from a clay pipe occuring ten years earlier. WISHART.

An Attempt to Treat Tuberculous Affections of the Pharynx and of the Larynx by Trichloracetic Acid. Dr. OKOUNEFF. *Arch. intern. de laryngol.*, March-April, 1905, No. 2.

The author has obtained excellent results by this method for which he claims the following advantage:

The formation of a whitish slough following the cauterization shows exactly how far the liquid has been applied; that slough remains adherent for two or three days and prevents infection from the sputum.

The author has never had complications from this treatment. The application should extend as far as the healthy tissues.

SCHEPPEGRELL.

THE TECHNIQUE OF ADENOIDECTOMY AND A PERFECTED CURETTE.*

BY F. GURNEY STUBBS, M. D., CHICAGO.

There is no apology needed for bringing before a body of such distinguished laryngologists as this, a paper on this subject, for the last word has not been said regarding either the anatomical consideration of lymphoid tissue in the naso-pharynx, or the technique of its removal; and the latter depends absolutely upon the former.

In the first place, we have to deal with a part of what is called "Waldeyer's ring;" that is, encircling the entrance to the pharynx we find in or under the mucosa, more or less continuously, lymphoid tissue, which in four points is massed, giving us the four tonsils, lingual, pharyngeal and faucial. These are found in all cases, in adults as well as in children, though in some they are so small as to seem, at first glance, to be absent. Occasionally we see cases where the whole ring seems to be enlarged, so that there is no line separating the lower pole of the faucial tonsil and it seems to continue well down towards the larynx and over onto the tongue; numerous follicles show on the lateral pharyngeal walls posterior to the posterior pillar of the tonsil; and where a view can be obtained, the lateral recesses of the naso-pharynx (Fossa of Rosenmueller) are also seen to be thickened. But this rather rare condition does not for a minute lead one to regard the faucial tonsil as any the less a circumscribed body nor do we attempt to go beyond this tonsillar body in its removal.

In like manner we must regard the pharyngeal tonsil. There is always a central mass, larger and thicker, no matter how much increase there may be in lymphoid tissue laterally. While the pharyngeal tonsil differs little in structure from the faucial, yet the pathological changes may be divided into four varieties—the soft, diffuse, composed largely of lymphoid structure, the oedematous or cyanotic; and the hard or hypoplastic, due to an increase of lymphoid structure and a decided overgrowth in the connective tissue element.

In all cases the adenoid is lobulated, the lobes lying close together so as to have their adjoining sides flat and the lateral ones

*Read before the regular meeting of the Chicago Laryngological and Otological Society, March 11, 1908.

shorter and not so deep, so that on its removal it has a rather circular outline.

I have often found cheesy masses of epithelial debris similar to those found in tonsillar crypts, which had been retained by the superficial edges of these lobes becoming adherent and forming a sort of pocket.

The next step is to study the anatomical seat of the adenoid. This is on the vault of the pharynx. I use the word vault advisedly, for two reasons. First, the adenoid proper does not extend into the Fossa of Rosenmueller. If that space, which is the lateral angle of the union of vault and lateral wall of the pharynx is any way encroached upon, it is only due to an increase of the lymphoid tissue normally there and is not the adenoid proper. Secondly, the same condition is present where there is any thickening on the posterior wall below the adenoid. The adenoid is attached only by its posterior edge to the posterior wall. Its base is entirely on the vault. By the term vault I mean that part of the pharynx which is nearly horizontal, beginning anteriorly at the junction of the vomer and sphenoid, extending posteriorly to where it curves downward to

the perpendicular, on the anterior surface of the atlas and axis, It is the basilar process of the sphenoid and occiput and is fairly level. The lateral walls of the pharynx meet the vault at a right angle. Hence we have a well defined body attached to a fairly level or sloping surface and it only needs a proper knife to slice it off.

This is met by the so-called Adenoid Curette. But not by any and every curette one will find in the shop. By a study of the skeleton, cadaver and live subject, I find that the shape of the curette is absolutely essential to a thorough removal. Further, it must be used correctly. With a *correct intrument* and a *correct technique the adenoid should be removed entire with only one sweep of the knife.*

I have altered the well-known von Beckmann curette as to the angle, depth and curve of knife, width of side, or supporting pieces and their position as to recession from edge of knife. By its correct use it does not curette or scrape, but slices the adenoid smoothly from its basal attachment, with the individual lobes entire and included with their base.

It is necessary to use an instrument as wide as will snugly fit into the vault and reaching from one lateral recess to the other. To meet this I have chosen three sizes which will suit all ages, the inner cutting edges being respectively, thirteen, sixteen and nineteen millimeters across.

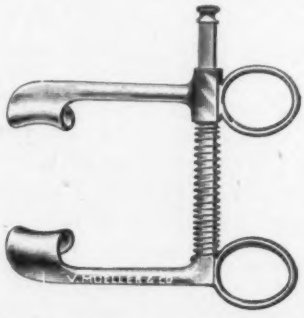
If the patient is in the erect position, with or without an anesthetic, or in prone position under general anesthetic, the procedure is the same.

The mouth is opened to the fullest extent, and for this I have modified the Murdock self-retaining mouth-gag. This is actually

self-retaining and is not in the way, allows the patient to be turned from side to side without removal, and can be quickly removed by the finger rings I have added as easily as one would wish.

A tongue depressor is of assistance in allowing a free view, to see that the curette is passed between the posterior pillars and up back of the uvula, and then withdrawn.

As soon as the back of the knife is raised above the uvula it is drawn forward to the vomer and hugging its posterior edge is



pushed as tight to the vault as possible. It is then forced directly backward in a horizontal plane till it reaches the posterior wall when the handle is sharply elevated and the knife cuts into the angle which is there present. Elevating the handle still more causes the knife to cut one to one and a half centimeters down the posterior wall at which point the lower limit of the adenoid is reached.

Then a quick withdrawal of the curette will sever the adenoid from its attachment at its lower periphery and in many cases precipitate it onto the floor. If this does not occur it will lie on the lateral wall of the pharynx, if the patient is on his side (the correct position), and can be withdrawn by fingers or forceps. No hood to catch the adenoid can be attached to a curette without impairing its usefulness. The danger of obstructing the larynx by the detached adenoid is mostly theoretical anyway.

To explain the reason of this detail: *First,* the back of the knife must hug the back of the vomer all the way up in order not to force any lobes or parts of lobes into the posterior choanae and thus interfere with the knife being properly applied entirely in front of the adenoid. This cannot be done where the knife is first applied to the posterior wall of the pharynx and then forced up over the adenoid, which procedure explains why so often after its use a fringe of adenoid remains at the posterior choanae and the symptoms of obstruction are not relieved.

Secondly, the direction of the stroke of the knife must first be directly backwards and only after it meets the posterior wall should it be made to cut downwards. My observations have been that too many operators depress the knife with the beginning of the stroke and then return and make the same mistake for seven or eight strokes more and have only a few pieces and much blood to show for all the misdirected scratching.

Thirdly, the downward stroke on the posterior wall should only be for one to one and a half centimeters and then a quick pull or jerk forward to free it and if possible throw it entirely out of the mouth. There is no excuse for stripping the posterior wall as is so frequently done. This is caused by scraping below where the adenoid is attached and by the wrong angle of the knife. I have set the knife at such an angle that it cuts horizontally on the vault and will not scrape down the back wall if drawn sharply forwards as soon as the adenoid is separated above. It is also straighter on its upper cutting edges and its supports recede so that it can approach the posterior wall flush to its union with the vault and thus not leave a mass of adenoid tissue in the angle. If one will compare many instruments found on sale it will be seen that the knife edge cannot cut at all on the vault but only with a downward motion on the posterior wall. This instrument is narrow so as to allow its being raised anteriorly to the adenoid and thus leaves none where it is most essential to be removed.

Lastly, while more delicately formed it is hand forged and thus can be relied upon not to break. And it should be kept sharp for it is not a scraper but a knife.

I believe too much importance cannot be attached to the details I have brought out, both in instrument and technique, if we are to completely remove adenoids as they should be. One can readily see from a study of the adenoids I present that they are complete in their entirety and I have proven them so by both digital examination and rhinoscopy where possible. By the study of same one also sees that adenoid forceps only tears away fragments and leaves a ragged, uneven surface, cannot get down to the absolute base, and cannot reach into the lateral recesses as well as a properly fitting curette. In an infant one cannot even manipulate a forceps. I have found no trouble at all in using curette No. 1 in an infant six months old. In such a case very little force is required for the adenoid is soft, but it will be found just as complete as in older patients.

There are two chief indications for the removal of adenoids; first, where they act as an obstruction to nasal respiration by blocking the posterior choanae, or where they encroach on the Eustachian eminences; second, where by their formation of pockets they act as an antrim of infection similar to the tonsil.

These indications can be absolutely met by this curette in their removal. It is true it will not cut laterally and dig into the Fossa of Rosenmueller, but it is not necessary in meeting the ordinary indications. That would be attempted only in the special cases where the lymphoid (I do not use the word adenoid) tissue is in such increased amount that the aurist sees the special need for its removal. Then it would be accomplished by special curettes as the lateral ones of Fein, Mygind and others. This rather rare procedure I would disregard in all but special cases.

A study of the exudative diathesis of Czerny would show us that removal of more than the bodies of tissue meeting the two indications I have named would be unwarranted as the lymphoid tissue is not a cause *per se,* but only a manifestation of systemic conditions.

103 State Street.

THE STATUS LYMPHATICUS, WITH PARTICULAR REFERENCE TO ANESTHESIA IN TONSIL AND ADENOID OPERATIONS.*

BY W. HUMES ROBERTS, M. D., PASADENA, CAL.

In and about Los Angeles, so many deaths have recently occurred under general anesthesia, either during or immediately following minor operations, such as the removal of tonsils and adenoids, that it seems advisable to look into the subject to see if such sad occurrences can be prevented in the future. The subject of deaths from anesthetics has been thoroughly gone into in the past, and, by most investigators, it has been ascribed to a condition existing in the patient which has been termed the "status lymphaticus" or the "lymphatic constitution." I make no claims for originality for what I am about to present, but I simply wish to set forth some well established facts in connection with the status lymphaticus, with the hope of thus refreshing the minds of all present, in order that we may be placed more thoroughly on our guard, and that we may thus prevent deaths which are bound to occur if anesthetics are to be used as indiscriminately in the future as they have been in the past. Few physicians are capable of giving an anesthetic, and no one without medical training should *ever* give one. Nothing is more erroneous than the idea that anyone can give an anesthetic. Doubtless many deaths under anesthetics have been caused by gross or almost criminal carelessness.

This paper is to deal solely with those cases in which death has occurred when the anesthetic has been carefully administered by a proper anesthetist, and in which, in all probability, the status lymphaticus existed, as is shown in the report of one autopsy, In nearly all cases in which the status lymphaticus has been demonstrated at autopsy, enlargement of the thymus gland has been found. This enlargement, associated with sudden death, was first mentioned by Bichat in 1723, but the connection was then apparently overlooked until 1829, when Copp called attention to it. Little notice was paid to it until 1888, when Jacobi, in this country, and Grawitz, in Germany, took it up.

*Read before the Western Section of the American Laryngological, Rhinological and Otological Society, in charge of the meeting of the Ear, Nose and Throat Section, California State Medical Soc., Apr. 21, 1908.

In 1889, Paltauf, of the Vienna School, wrote: "Hyperplasia of the thymus is physiologically, as well as anatomically, an element of a general hyperplasia, and is a result of a derangement of nutrition or metabolism which also causes a degeneration of the cardiac centers." He found at autopsy, in addition to enlargement of the thymus, a hyperplasia of the entire lymphatic apparatus; enlarged nodes all over the body; of faucial and lingual tonsils; of the intestinal follicies; enlargement of the spleen and hypertrophy of its follicles; changes in the circulatory system. Here he noted a true hypoplasia; the aorta and small arteries were smaller and thinner than normal, and there were signs of cardiac dilatation.

Kolisko,[1] who averages some 2,000 autopsies each year, with about six of these dying from cardiac paralysis due to chloroform, says: "In these cases we always find the condition known as the 'habitus lymphaticus.' The nature of this condition is (1) a persistent thymus gland, which has often become considerably enlarged through an increase of its lymphatic tissue; (2) enlarged lymph glands; (3) adenoid vegetations in the pharynx, enlarged follicles at the root of the tongue and in the pharynx; (4) enlarged follicles in the intestines and stomach. These conditions are accompanied by some dilatation of the heart; with no changes in the muscles or endocardium; or occasionally there is evidence of a previous cardiac dilatation, marked by thickening in the endocardium, but not recognized clinically. There is also very frequently found a hypoplastic condition of the arterial system."

Is it possible to recognize the status lymphaticus prior to the beginning of symptoms which generally terminate in death? Many physicians, especially those of the Vienna School, claim that it is in some cases. Blumer[2], quoting from Escderick, who is one of the foremost authorities, says: "The subjects of the status lymphaticus usually have a pale, thin skin, a pasty complexion, and a good pad of subcutaneous fat. Frequently signs of rachitis or scrofula are present. The superficial lymph glands, especially those of the neck and axilla, are enlarged. There is hypertrophy of the tonsils, the circumvallate papillae of the tongue, and the pharyngeal lymphatic apparatus (adenoids). The spleen is often palpable." There may be faulty development of the sexual organs, a thymus capable of percussion, and an increase of the lymphocytes in the blood. We should be very suspicious if, in addition to the foregoing, we obtain in children a history of dyspnea and laryngismus

stridulus, and in adults a history of fainting attacks. It should also be kept in mind that rachitis and goitre are often associated with the status lymphaticus. It would seem reasonable to suppose in this connection that the status lymphaticus is probably the cause of the frequent deaths occurring after operations for goitre. It is thus seen that hypertrophy of the faucial and pharyngeal tonsils are among the symptoms found in the status lymphaticus. We must remove these enlarged glands, when of sufficient size to interfere with the growth and development of the patient, with the least possible risk and shock.

Blumer[2] says: "Individuals who are the subjects of the status lymphaticus are born with an instability of the mechanism regulating the so-called 'horror autoxicus,' at any rate, so far as the lymphatic apparatus is concerned, so that they are subject to intermittent attacks of lymphotoxemia which may lead to reflex nervous phenomena of various kinds, or may cause death from cardiac paralysis. During the attacks of lymphotoxemia, such individuals are especially susceptible to the action of the bacterial or chemical poisons, and also to physical and psychical shocks, which at these times may cause their death under circumstances which would be trivial to a normal individual." This would explain the deaths which have occurred following the injection of remedial agents—as in the well known case of Prof. Langerhans' son, who died soon after receiving diphtheria antitoxin hypodermically. This would also explain deaths following shocks, frights, trivial injuries, or after diving in cold water.

Blumer,[2] in concluding his comprehensive paper on the status lymphaticus, says: "(1) The condition known as the status lymphaticus is a definite pathological entity. (2) It is probably associated with, if not due to, a condition of intermittent lymphotoxemia. (3) It may be associated with sudden death; probably, as a result of lymphotoxemia alone in some cases, or as a result of the action of toxic, physical, or psychic injuries, which are rendered much more powerful than usual by the predisposing action of the lymphotoxemia. (4) In some cases the sudden death is undoubtedly mechanical and due to asphyxia from pressure of the enlarged thymus on the trachea."

Olmacher[3] says that many deaths from status lymphaticus are due to increase of intra-cranial pressure with sudden edema, the clinical picture depending on the site of the edema, and the resulting

pressure. If the external surface of the cerebrum is involved, various convulsions of the motor apparatus occur; if the floor of the fourth ventricle, sudden cardiac or respiratory failure.

Most surgeons admit that to remove tonsils and adenoids properly, general anesthesia is necessary. What anesthetic is safest? Halstead,[4] in an able paper read before this society at its general meeting in Philadelphia, 1900, showed clearly the necessity of performing the adenoid operation on children under some sort of general anesthetic, in order to avoid the great shock to the child's nervous system, which would occur where no anesthetic is used, or when only cocaine is used locally. In addition to the fact that this operation cannot be thoroughly performed unless the child is unconscious, the shock would be sufficient to cause the death of any patient with the status lymphaticus, and this should condemn it. Halstead points out the great danger of giving chloroform to any child with adenoids or enlarged tonsils, whether being operated for them or for something else. The lymphatic tendency is most marked in children before puberty, and it is during this time that chloroform is particularly unsafe. The saying that chloroform is the best anesthetic for children is amply refuted by statistics. Chloroform is a decided depressant, and when with children there is added fright with violent struggling against the anesthetic, we have a combination that can readily bring on cardiac syncope in a patient often predisposed to it by the status lymphaticus. This complex is undoubtedly the cause of so many deaths under chloroform before operation is begun.

Sanford[5] has reported a death following the removal of adenoids under cocaine. Were cocaine more generally used, many deaths would undoubtedly occur, as young children are quite susceptible to its toxic effects.

Dr. W. J. McCardie,[6] in a recent article, reports thirty deaths from anesthesia, in which the status lymphaticus was demonstrated. These occurred as follows:

Following chloroform	17
Following ether	6
Following chloroform and ether	5
Following nitrous oxide	2
Following ethyl chloride	0
	30

Thus, in twenty-two out of the thirty, chloroform was used. The youngest patient was six months, the oldest fifty-five years. Twenty-four were under twenty years.

Dr. John Wyeth,[7] of New York, performs seventy-five per cent of his operations under chloroform, but when operating on children he uses ether, as he considers chloroform too dangerous.

McGuire[8] says: "Recent investigation, however, seems to show that ether is equally as dangerous (as chloroform) under similar circumstances." With this I cannot agree.

Dr. Hill Hastings, when house surgeon at the New York Eye and Ear Infirmary, went over the records of tonsil and adenoid operations, covering thousands of operations which had been performed during a period of five years, and he did not find a death. Indeed, I believe they have never had a death from the anesthetic in this operation, and ether is invariably used.

In personal communications from Dr. E. A. Crockett and from Dr. Philip Hammond of Boston, they report that they have never known of a death in Boston from ether in the tonsil or adenoid operation. I may add that, in Boston, ether is always the anesthetic used, and that the patient is placed in the upright position for the operation.

Among the thousands of operations covered by the reports of Hastings, Crockett and Hammond, there must have been some operations on children with the status lymphaticus; and yet, among these reports, there is not a fatal result, and all were operated upon under ether.

A few miles from Los Angeles, in a seaside town of some 10,000 inhabitants, there have been three deaths within a year—these occurred during tonsil or adenoid operations, and chloroform was used in each case.

In and about Los Angeles, the following deaths have occurred as the result of anesthesia. In only one case was autopsy permitted, and in this the status lymphaticus was found. In several others there is no doubt that this condition was present, but in absence of autopsies no positive claims can be made.

I wish to thank Dr. F. D. Bullard of Los Angeles, for his kindness in sending me the reports of most of these deaths.

CHLOROFORM.

Case 1. Boy, aged thirteen. Operation—Removal of tonsils and middle turbinates. The anesthetic was taken nicely, and the op-

eration was completed with the patient in good condition. His pulse then became irregular, breathing shallow, and face suddenly blanched; after the beginning of artificial respiration, he gasped two or three times, and then expired.

Case 2. Child, aged three. Operation—Removal of adenoids. The surgeon had just started to remove the adenoids when it was noticed that breathing had stopped. It was then found that the heart had ceased beating. This child had previously had chloroform administered for circumcision. Was this a case of intermittent lymphotoxemia?

Case 3. Child. Operation—Removal of adenoids. The surgeon would not reply to my letters asking for details of the case.

Case 4. Child. Operation—Removal of tonsils and adenoids. This case is reported in the words of the surgeon in whose hospital service it occurred. "The patient, a girl twelve years old, was brought into the operating room at the ——— Hospital, anesthetized and ready for me to operate. I had never seen the patient before. My memory is that she was a healthy looking girl of about twelve years of age, of medium build, neither fat nor thin. The patient was not fully under the anesthetic, so operation was delayed until the anesthetizer stated she was fully anesthetized. My recollection is that not a long time elapsed before operating and not much anesthetic given, but I was not paying attention to that part of it. I remember, however, that there was no struggling during the removal of the tonsils and adenoids. The operation itself took a very short time, I should say not over three minutes. On completion of the operation I was struck at once by the extreme pallor of the patient and the fact that she was not breathing. There was no cyanosis. I do not remember whether the pulse was beating or not, nor whether the pupil was dilated or not, or responsive to light. Artificial respiration and other measures were promptly used, but without the slightest sign of return of the respiration or the heart beat. No autopsy was secured. Chloroform was used because I had failed to tell the interne my preference for ether. The interne told me he had examined the chest and that the heart was normal. The patient had only been in the hospital an hour or two, so that nothing was known of her."

Case 5. Adult. Operation—Extraction of tooth.

Case 6. Woman. Operation—Dressing surgical wound. Ether had been used at the operation.

Case 7. Adult. Operation—Lancing of carbuncle on the neck.

Case 8. Adult. Operation—Avulsion of the toe nail.

Case 9. Adult. Died while preparing the abdomen for operation.

Case 10. Adult. Died before beginning the operation; fear probably figured largely in this case.

Case 11. Adult. Tonic spasm of the jaw, and probably "swallowing of the tongue." The attendants were unable to open the mouth.

Case 12. Adult. Lancing of carbuncle.

Case 13. Adult. Uterine curettement at early stage.

Case 14. Adult. Uterine curettement at the end of the operation.

Case 15. Adult. Hemorrhoids. Death occurred during dilatation of the sphincter.

ETHER.

Case 16 Woman, aged thirty-six. Death occurred from edema of the lungs, one hour after a prolonged operation.

BROMIDE OF ETHYL.

Case 17. Woman, aged twenty-three, native of Sweden. Operation—Extraction of teeth. Three minutes after administering two drachms of bromide of ethyl, extraction was begun. One tooth had been removed with some difficulty, when the patient blanched and breathing became shallow. Artificial respiration was commenced, giving slight improvement of color, which immediately became bad again. Dr. Stanley P. Black made an autopsy, and his report is as follows:

"Body well nourished; subcutaneous fat tissue well developed. On removing the sternum, the thymus gland was situated beneath the manubrium, size 3 by 2 1-2 by 3-8 inches. Lungs normal. Heart—left ventricle well contracted, right ventricle flabby; cavity empty, valves normal. Liver normal. Spleen somewhat enlarged. Pancreas normal. Kidneys normal. Intestinal tract, the solitary follicles at base of the tongue in esophagus, stomach, duodenum, jejunum, ileum and colon quite prominent, standing up under mucosa like shot. Peyer's patches likewise swollen. Glottis normal. Diagnosis—Paralysis of right ventricle. Status lymphaticus."

The records of the deaths of some of the patients under chloroform anesthesia have shown a history of having successfully taken

this anesthetic once, only to succumb to a later administration of it. An intermittent lymphotoxemia could easily account for this, the lymphotoxemia being in abeyance at the first and present at the fatal administration. Whether or not death would have occurred in these cases if ether had been used, it is impossible to say. We do know, however, that in most of the fatal cases, cardiac paralysis occurred; and that chloroform is a cardiac depressant, while ether is a cardiac stimulant.

The status lymphaticus is most common in the first decade. Is it merely a coincidence, then, that in this decade a greater proportion of deaths occur from chloroform than from ether?

SUMMARY.

1. We should always keep in mind the possibility of the status lymphaticus being present in children who have enlarged superficial lymph glands, adenoids, or signs of rachitis.

2. In the status lymphaticus, *all* anesthetics are dangerous, but particularly, chloroform.

3. In *all* operations on children, avoid *chloroform*.

4. In operations for the removal of tonsils and adenoids, ether is the safest anesthetic to use.

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SOME SURGICAL EMERGENCIES ASSOCIATED WITH THE TUBERCULOUS LARYNX.*

BY CHARLES PREVOST GRAYSON, M. D., PHILADELPHIA.

I am quite aware that the small group of cases of which I shall speak represents a series of conditions that, while they can lay no claim to novelty, yet possess a clinical interest which arises largely from the very fact of their frequency. My purpose in reporting them is to give support to my assertion that they are of much too frequent occurrence, that they are almost if not always preventable, and that the responsibility for their occurrence is to be laid elsewhere than at the door of the laryngologist. As compared with others of the laryngeal complications of pulmonary tuberculosis, these cases of mine may not, perhaps, be regarded as among those most common, but I wish to submit to you the question as to whether it is not extremely seldom that there is any excuse for their happening at all. Speaking for myself, I have no hesitation in saying that there should be no such thing as emergency surgery in connection with the tuberculous larynx, and I say with equal emphasis that there would be no such thing if the general practitioner acquired the habit of placing the larynx of each of his tuberculous patients under the protection of the specialist either at the moment that there was reason to suspect its implication in the disease, or, better than this, even before such reason became apparent. I shall venture to tax your patience with no more than simply the essential clinical details of three comparatively recent cases in my own practice.

The first, a man of forty, with but moderately active involvement of the upper portions of both lungs, who had been under treatment for five months and who had developed laryngeal symptoms something more than a month previous to my seeing him. The request for my assistance arose from a rapidly increasing dyspnea which by the time I reached him in one of the suburbs of Philadelphia, was so extreme as momentarily to threaten death. A hurried glimpse of the larynx disclosed a general infiltration moderate in degree everywhere but in the interarytenoid space. Here, however, it was of such prominence

*Read before the thirtieth annual Congress of the American Laryngological Association, Montreal, Canada, May 11-13, 1908.

that the cords were widely separated and through the interval between them I could see that the seriously obstructive condition was a sub-glottic edema or infiltration. Under the circumstances I would have preferred a low tracheotomy, but there seemed scarcely time for a careful dissection or anything that would have prolonged the dyspnea by a single unnecessary moment, and so the high operation was performed. The patient is still living, the enforced rest has greatly benefited the larynx, but the outlook for recovery is quite hopeless. If a few weeks earlier, the larynx had been properly cared for I am confident that no such condition would have developed within it and that the ultimate result of the case might have been a happier one.

The second of these patients was a lad of nineteen whose pulmonary disease was of about two years' standing. Fully three months before my summons, laryngeal involvement had been announced by vocal impairment and this had been allowed to progress without any interference until there was complete suppression of the voice. Ten days previous to my visit pain had been added to the aphonia, had rapidly increased, and within another day or or two dysphagia and dyspnea made an almost simultaneous appearance. It was the seemingly imminent necessity for tracheotomy that called me to his bedside. The mirror disclosed an enormous swelling of the tissues enveloping the left arytenoid, the color of the tumor being sufficient of itself to indicate its purulent contents. With the patient recumbent and his head lowered the abscess was freely incised. The following day the subsidence of the swelling permitted the remnants of the deeply ulcerated cords to be seen and it became clear, I thought, that a perichondritis of the arytenoid had, as the result of a secondary pyogenic infection, eventuated in the abscess formation. Am I over credulous in believing that this condition also could not only have been prevented, but easily so by timely treatment of the affected cords?

The last case of the three was that of a woman of twenty-eight in whose larynx there had been interarytenoid ulceration of sufficiently long duration to have developed a prominent mass of granulations sprouting from its edges, and, in addition to this, extreme infiltrative swelling of both aryteno-epiglottic folds. As the result of a wetting and subsequent chill due to a sudden shower while she was out driving, an acute inflammatory edema encroached still further upon the already narrowed glottic space and

compelled an immediate tracheotomy. Again I contend that the necessity for surgical intervention in this case as in the others would not have arisen had systematic inspection of the larynx been adopted earlier in the course of the disease.

Surely, "he who runs may read" the lesson that should be taught by such cases as these, yet their continued daily occurrence not only in the country districts but in the very midst of our large cities shows that it is still unlearned. I fancy that few if any of us will doubt that if early co-operation between the general practitioner and the laryngologist became the rule rather than the exception, the large percentage of secondary infections of the larynx occurring during the course of pulmonary tuberculosis would be very materially reduced. The frequency of such involvement, as shown by the records of the post-mortem room, is at this day inexcusably large, and inferentially it suggests the surprisingly small proportion of these cases that are permitted to enjoy either the prophylactic or the curative aid, so far as the larynx is concerned, that the laryngologists might extend. This proportion, as it relates to the large number of charity cases that find their way to the post-mortem table, is, I am inclined to think, but very little larger than that that would be shown by a strict record of private patients if such were obtainable. For various reasons, more or less open to criticism, many of these unfortunates are allowed to develop laryngeal lesions which, receiving no better treatment, perhaps, than that afforded by cocaine and orthoform lozenges, medicated inhalations of doubtful utility, and gargles concerning the harmfulness of which there can be no doubt, steadily progress to the stage at which, pain and difficulty seriously crippling nutrition, the patient loses his one and only chance of recovery. I maintain that the physician who, without incontestable reason, permits this sort of thing deserves the pillory of professional criticism no less than he who incompetently temporizes with a purulent median otitis complicating an infectious fever until the mastoid and the cranial cavity are invaded.

251 South Sixteenth Street.

REPORT OF A CASE OF REMOVAL OF A FOREIGN BODY, A GRAIN OF CORN, FROM THE TRACHEA OF A CHILD SIX YEARS OLD.*

BY J. H. BRYAN, M. D., WASHINGTON, D. C.

The following is a short account of a successful case of the removal of a foreign body from the trachea of a child by tracheotomy, after an unsuccessful attempt at tracheoscopy had been made.

Paul B., aged 6 years, was admitted to the Episcopal Eye, Ear and Throat Hospital January 22d, 1908, giving the following history:

Several days before his admission to the hospital he was playing horse, and while in the act of munching corn from the cob, a large grain was drawn through the larynx into the trachea. He was seized with violent coughing and dyspnea; but he soon quieted down to such an extent that when his family physician examined him he could not find any difficulty with the breathing, and concluded that the grain of corn had not passed into the trachea. During the night, however, he was seized with several very severe attacks of dyspnea and coughing, which continued through the following day, when the breathing became quiet again. He was then brought to Washington and admitted to my service in the Eye, Ear and Throat Hospital January 22d.

On admission, I made a careful examination of the child, and found him suffering from a large hypertrophy of the post-nasal lymphoid tissue and hypertrophy of the faucial tonsils. His color was natural, his voice thick and somewhat husky, which could be accounted for by the enlarged tonsils and the adenoid. The respirations were somewhat quickened, but not more so than one would expect in a timid child when in the presence of strangers. Auscultation showed large and small mucous rales over both sides of the chest anteriorly and posteriorly. The air apparently entered the lungs freely.

An X-ray picture was made, but it did not reveal the presence of a foreign body in the air passages. He was kept in the hospital under close observation for three days, but as no dyspnea was ob-

*Read before the thirtieth annual Congress of the American Laryngological Association, Montreal, Canada, May 11-13, 1908.

served in this time he was allowed to return to his home in Maryland.

On the morning of January 30th, he returned to the hospital suffering from intense dyspnea and marked cyanosis. An examination of the lungs at this time showed a complete absence of the respiratory sounds on the right side, while mucous rales were heard on the left side both anteriorly and posteriorly. When I saw him about two and a half hours after his admission, these physical signs had completely changed. The air was found to be passing freely into all parts of the lungs. He was still breathing with great difficulty and complaining of intense pain in the subglottic region. Evidently the foreign body which had been engaged in the large bronchus on the right side had been dislodged and had been carried into the upper part of the trachea, where it was caught by the swollen mucous membrane.

I had him sent to the operating room, and placed under chloroform anesthesia with the view of trying to remove the body through a Killian tracheal tube. I made several ineffectual efforts to pass the small tube through the larynx, but owing to the swollen condition of the mucous membrane lining the larynx, I found this was impossible; just at that moment the child ceased to breath and became very cyanotic. I then did a rapid tracheotomy, expecting to pass the tube through the tracheal opening and remove the foreign body in this way. As soon as the trachea was opened the child commenced to breath freely again, a grain of corn was seen to pass the tracheal opening on its way to the lower trachea. It made several such excursions before I was able to grasp it with my forceps and remove it. A tracheotomy tube was then introduced into the tracheal opening. He rallied quickly from the operation, and as all obstruction to the respiration ceased after the removal of the foreign body he was sent to his bed.

When the grain of corn was removed it was found to be an unusually large one, and very much swollen from the moisture absorbed since its introduction into the trachea.

The tracheotomy tube was removed on the fourth day, and the wound allowed to close. Some laryngeal stridor remained for at least twenty-four hours longer, when it ceased. The patient made an uninterrupted recovery, and was discharged from the hospital on the ninth day.

This case is interesting, and shows it is not always best to persist in passing the Killian tube through a swollen larynx after several ineffectual attempts have been made. Had I continued my efforts to reach the trachea in this way, I am sure I would have done irreparable injury to the soft parts, and had I succeeded in introducing the tube through the larynx it would have been impossible to remove a grain of corn of this size through the tube, but with a large tube introduced through a tracheal opening I might have been able to reach the foreign body and remove it. Fortunately the introduction of the tube through the tracheal opening in this case was not necessary, as the above history shows.

818 Seventeenth Street.

Critical Remarks upon Empyema of the Saccus Endolymphaticus, and the Importance of the Aqueductus Vestibuli as a Path of Infection. OSCAR WAGENER. *Archiv fur Ohrenheilkunde*, July 1906.

The author reports a case of cerebellar abscess, in which the abscess was adherent to the posterior surface of the petrous portion of the temporal bone, in the neighborhood of the opening of the aqueduct of the vestibule. Careful microscopical examination revealed the fact that the abscess was caused by perforation of a bone abscess through the dura. The dura was infiltrated with pus, but it could be clearly seen that the saccus endolymphaticus was free from pus, although surrounded by infiltration. The aqueduct was also free from exudate.

In all the cases reported in the literature, in which it was claimed that infection had travelled from the labyrinth through the aqueduct and sac to the cerebellum, the author could find only one case in which microscopical examination showed the presence of pus in the sac and aqueduct, the case of Pollitzer; and the author is inclined to agree with the latter in the view that such a mode of infection is an unusual one. The infection generally travels by direct extension through the bone.

YANKAUER.

REPORT OF A CASE OF ANGIO-MYXO-SARCOMA OF LARYNX WITH EXPULSION OF LARGE TUMOR.*

BY L. ROSA H. GANTT. M. D., SPARTANBURG, S. C.

While I have nothing brilliant in the way of results, and nothing new to advance in this report, I feel that this case is of sufficient interest to the laryngologist to be put on record. Primary sarcoma of the larynx as compared to carcinoma is quite infrequent, but angio-myxo-sarcoma is quite rare, there being but a few recorded cases, and this fact, coupled with the belief that every case of malignant growth in the larynx should be put on record, is my only reason for making this report.

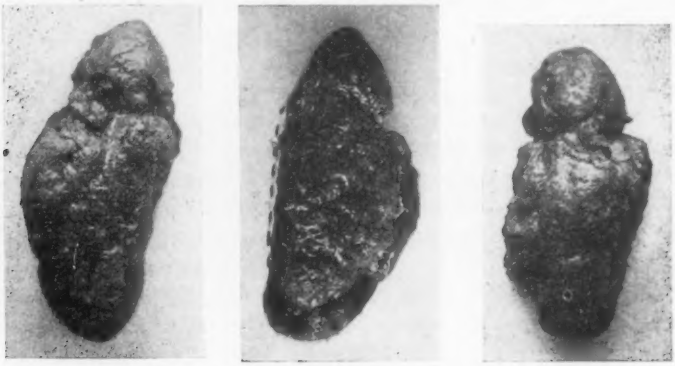
On April 7th last, patient came to me complaining of irritable throat, some pain on deglutition, and slightly labored breathing on exertion or on mounting stairs, which he had noticed for about six weeks, but as he thought it due to excessive smoking on his part, did not seek medical aid until urged by his friends to do so. Patient's general appearance was bad, and voice was of very low pitch, weak and husky. Examination showed fairly healthy nose, naso-pharynx and upper pharynx, but there was so much irritability in the throat and excessive secretion of saliva, that even with a cocaine spray three visits were consumed in making the throat tolerant of laryngeal mirror, and on the fourth day a large mass, which seemed to almost fill the space, was made out on the right side of larynx below the cords, the exposed portion showing a dirty, sloughing surface. Patient was told that he had a growth in his larynx, and was questioned more closely as to history, which is as follows:

Mr. B., age 67, expert soap maker, average weight 132 pounds, has lost fifteen pounds in past year. When about forty years of age had severe skin eruption on hands and face, which required treatment for several months. About six years ago had a number of carbuncles, confined to legs only, and which left deep cicatrices. Patient had always led an active life, and except for the two periods of ill health, above mentioned, always felt well and had good appetite; he denied syphilis.

Family History—Nothing known of grandparents. Both parents, one sister and one brother, died of old age, one brother died at 56

*Reported at meeting of Spartanburg Medical Society.

of tuberculosis; another, who led a very dissipated life, died at the age of 60. One sister died during pregnancy, aged 28. The only remaining member of family beside himself—a sister, aged 72—he thinks has cancer of the stomach, but doesn't know this positively, as he hasn't seen her for six years. On the day of patient's fourth visit to me I requested him to return to my office in the evening, as a laryngologist from an adjoining town would then be in my office, and I wished him to see the case with me. Dr. Carpenter, of Greenville, S. C., agreed with me that the condition of patient was serious, and advised him either to return to his family in the North or permit us to operate on him immediately, stating that unless the growth was removed very soon there was grave probability of his choking to death. Patient declined operation and de-



1. Exposed Surface. 2. Attached Surface (dotted lines represent attachment). 3. Attached Surface.

cided to wait here for several days and wind up his business before returning to his home. On the sixth morning Mr. B. walked into my office with a large tumor in his hand and gave me this history:—He slept well the night before, voice was clearer, and his throat felt so comfortable that he expected to enjoy a hearty breakfast, but on attempting to swallow found throat quite painful. After being at his office—possibly half an hour—he began expectorating a little blood, and a carriage was ordered in which to send him to my office, but before the carriage arrived patient had coughing attack and feeling of suffocation and, being much alarmed, made frantic efforts for breath and ejected the growth, which was thrown about four feet away. About half-pint of blood was ex-

pectorated, but patient did not feel weak, and arrived at my office unattended ten minutes after expulsion of the growth. The larynx was examined with as little manipulation as possible for fear of exciting hemorrhage, and a growth about the size of a hazel nut was seen with a clean, raw surface, but no oozing of blood. Patient was sent to bed and ordered not to talk, and to partake of no food but iced milk until I could see him later in the day; he was then found quite comfortable, pulse good and strong, temperature normal, and no bloody expectoration, and having a sense of great relief in throat. On examining growth it was found to be two inches in length and one inch in diameter, its attached surface being nearly as great as its exposed surface—as shown by dotted line in picture 2. The exposed surface, illustration No. 1, was rather nodular in appearance, of greenish color, and much firmer than the attached portion, which latter, however, did not look like a sloughing surface. The tumor was submitted to microscopic examination, and in the meantime the patient was carefully watched, given supportive treatment and larynx cleansed daily with alkaline spray, but as his relief was so great it seemed difficult to make him realize that his condition was still serious. After a few days there was rapid development of the growth, and at the end of a week this second growth was almost, if not quite, as large as the one which had been expelled, and the patient was advised to have growth removed through external incision, but as he was quite anxious to attend to some business in a city several hundred miles distant, he was urged to go at once and to consult a specialist there. This he did, and growth was removed under local anesthesia, with snare and scissors through mouth, and this growth was also submitted for microscopic examination. The specimens being difficult to harden for section some little time elapsed before the report of angio- myxosarcoma was sent in by the pathologists. Two weeks after operation Mr. B. returned to Spartanburg, and on examining him I saw that the growth was much larger than ever before, and was rapidly encroaching on the esophagus. The growth being of such rapid development, and the patient in very bad condition, he was sent home to his wife and son to spend his last days, which seemed few in number, and which proved to be so, as he died from exhaustion six days later.

I wish to acknowledge the assistance given by Dr. J. Austin Ball, of Charleston, S. C., who made the pathological examination.

SUPPLEMENTAL REPORT OF A CASE OF XANTHOMA, WITH EXHIBITION OF PATIENT.*

BY JOHN EDWIN RHODES, M. D., CHICAGO.

I presented this patient before this Society in May, 1906. (THE LARYNGOSCOPE, October, 1906.) A few days after his presentation here, it became necessary to do tracheotomy to relieve his breathing. He is now wearing a tracheotomy tube, and has done so since that time. Permit me to recall a few points as to the disease, and the history of this patient, for the benefit of those who did not see him at that time. Briefly, xanthoma is a perfectly benign neoplasm, and is of a fibro-fatty character, deposited in the corium. This patient presents the two forms in which the disease is usually seen, the plaques and nodules. There were also the lesions as they are found on mucous membranes, although those that were present in the fauces have disappeared, that on the conjunctiva of the left eye is much less prominent now than then, and had at one time disappeared entirely.

The multiple forms seen here are rare in one individual, and when found in young people are usually congenital, but when found in adults are often associated with chronic jaundice, or with blycosuria, as in this case. The most common form is the xanthoma palpebrarum, which is not so rare. The lesions on the eyelids were marked when this patient was shown before, but have almost entirely disappeared now. The lesions on the skin have a deposit of pigment, varying from a light yellowish or brownish color to a deep bronze. The very rare condition shown here, the patches on the conjunctivae, are of a light yellowish color, and while that on the right eye is large, its position is such that it does not affect his vision, and is absolutely unirritating in its presence. The lesions on the neck have faded somewhat, but those about the shoulders, the gluteal region, the penis, the scrotum, etc., remain about as they were. They are little indurated, except the nodules on the penis, are little raised from the surface, and over some parts of the body are smooth and level with the surface. The patient is twenty years of age, the mother is living and well, and the father died of cerebral hemorrhage about three years ago. There is no

*Presented at the meeting of the Chicago Laryngological and Otological Society, April 14th, 1908.

history of any similar disease in the family. He has never had any severe illness, there has been no venereal trouble, and he has never used alcoholics or tobacco.

His present illness began about six years ago, the first symptoms being an intense itching of the eyelids, shoulders, etc. This was felt at intervals, and finally the eruption appeared simultaneously on the eyelids, neck, shoulders, penis, scrotum, and other parts of the body. Four years ago he began to have an intense and constant thirst, and to pass large quantities of urine, which now amounts to from seven to nine quarts a day. When he was first presented to the Society he complained of spells of dizziness and faintness, lasting a couple of minutes at a time, at intervals of two or three weeks at first, which had gradually increased in frequency to several attacks daily. In addition to this symptom there was an increasing difficulty in breathing, which was progressive in severity, and was very marked at that time. This became so pronounced that the tracheotomy was performed on the third of May, 1907.

This is the point in this case that makes it one of peculiar interest to the laryngologist, for it is the only one on record, so far as I know, where a xanthomatous lesion in the larynx has caused enough obstruction to necessitate such a procedure. When he was examined in 1906 the soft palate showed small, irregular patches of congestion, not raised from the surface, and without pigmentation. There was a slightly nodular condition of the pharynx. The right pillar of the fauces was somewhat contracted at the site of an old lesion, as was also the tip of the epiglottis. In the larynx, the nodules were so thickly placed that the vestibule was almost occluded, leaving only a small opening of two or three millimeters between the vocal bands and the vocal cords, for the passage of air. In a recent examination, I found that the lesions in the fauces had practically disappeared. Thorough cocainization is necessary to examine the larynx, when drawing forward the epiglottis gives a good view. The change here is marked, the swelling having subsided about fifty per cent, so that the vocal cords are now visible, in part, and respiration through the larynx is fairly easy. The patient, however, has often experimented in removing the tube for a time, but has found it necessary to replace it, as his breathing soon became too labored for comfort. I hope, from the improvement that has taken place, that he will some time be able to remove the tube permanently.

His general health is now excellent. His gain in weight since the tracheotomy has been forty pounds, and during all the inclement weather of the past winter he has followed his occupation, driving a milk wagon. I would call your attention to his voice, which is clear and strong, and which can be heard in all parts of the room, without closing the opening in the tube, which he protects with a few thicknesses of gauze. At first I gave him a tube with a ball valve, which allowed the ingress of air, but was closed on expiration. He discarded this very soon as he could not breathe easily. I then substituted one with an oval opening in the upper surface of the tube allowing free passage of air from the trachea to the larynx. This opening has seemed unnecessary, and since February 1 he has worn an ordinary tube and the amount of air passing around it to the larynx is sufficient for good vocalization.

100 State Street.

Parotid Fistula after Mastoid Operation. F. KRETSCHMANN. *Archiv fur Ohrenheilkunde*, July 1909.

Two of these unusual cases are reported. In both cases, a fistula occurred in the scar of a mastoid wound. In one case during the course of the healing of the original wound, in the other following a slight injury three years after the wound had healed. In both cases, the opening of the fistula was situated at about the level of the tip of the mastoid. The fistula was about two centimetres long and was directed upwards and inwards. In both cases a clear, thin watery fluid was discharged, the amount increasing markedly during mastication.

A fistula with a lymph-gland at the bottom would also discharge a large quantity of fluid; but the fluid in such cases is milky and contains fat. These characteristics were not present in the author's cases, but unfortunately a chemical examination of the fluid, which would have definitely established its origin from the parotid gland, was not made.

Both cases were cured by repeated cauterization with solid nitrate of silver, fused on a probe.

YANKAUER.

Tracheotomy in Slight Respiratory Obstruction Associated with Febrile Toxæmia. A. O. Bisson. *Lancet*, Jan. 26, 1907.

In fever practice there is a type of case occasionally encountered in which toxaemia is accompanied by very slight, apparently inconsiderable obstruction of respiration. Such cases are commonest in septic scarlatina, and now and then is seen in small-pox. There is also a septic type of diphtheria defined by Monti, in which the larynx is but little affected; there is slight obstruction, but it is not progressive, and the patient apparently dies as a result of the toxaemia.

The indications for tracheotomy in this type of cases are:

(1) *Difficult breathing.* In addition to the usual cause of obstruction there is not uncommonly marked lymphadenitis on both sides of the neck. This is often accompanied by edema, and even in some cases by an acute inflammation of the subcutaneous tissue of the neck,—possibly causing pressure on the trachea. Stress is laid on the fact that the obstruction is usually extremely light. It is its duration which tells on the general condition, and especially, on the strain of the heart.

(2) *Restlessness.* With this there may be return of fluid through the nose, cyanosis and extreme exhaustion.

(3) *Recession* is usually very slight, or even absent; it is only extreme in cases of laryngeal diphtheria.

(4) *Condition of the heart.*

(5) *Condition of the pulse.* There may be a typical pulsus paradoxus,—a sign of extreme gravity.

(6) *Color of the face,*—slight lividity about the mouth and nose.

(7) *Septic laryngitis.*

Tracheotomy has been done during the last one or two years for haemorrhage from the naso-pharynx in which the plugging of the posterior nares did not arrest the bleeding.

After tracheotomy the inprovement within a few hours is remarkable. It is better to operate under a local anaesthesia. A high and rapid tracheotomy with a small incision is recommended.

In children under three the prognosis is not so favorable.

Thomson.

SOCIETY PROCEEDINGS.

CHICAGO LARYNGOLOGICAL AND OTOLOGICAL SOCIETY.

Regular Meeting, May 12, 1908.

A. H. ANDREWS, M. D., PRESIDENT.

Dentigerous Cyst. By NORVAL H. PIERCE, M. D.

DISCUSSION.

DR. JOS. C. BECK: I have a case of dentigerous cyst of the follicular type. The patient had symptoms of antral trouble for several months. On examination I found the nasal cavity free from any pathologic condition. There was extreme tenderness over the antrum and alveolar process. At the floor of the antrum in the region of the bicuspids, there was a marked swelling and considerable tenderness. Two teeth were missing. A radiograph showed the teeth, contorted and misplaced, in the jaw. An incision was made over the swelling in the roof of the mouth, which led us into a cavity filled with grumous fluid. The teeth were removed, and the cavity was packed but did not heal. Later the walls of the cavity were scraped, the cavity was filled with a Mosetig-Moorhof plug, a flap taken from the gums. It finally healed. The patient has been entirely free from any inconvenience since then and wears a plate to supply the missing teeth. I hereby present this patient to show the excellent result. I also want to call attention now to the obliteration of the antral cavity in empyema by means of the injection of the bismuth-paraffin paste advocated by Dr. Emil Beck.

DR. GEORGE E. SHAMBAUGH: I wish to emphasize a point mentioned by Dr. Pierce regarding the symptoms of bulging of the external wall of the antrum in these cases. It is interesting to note that the older writers on the diseases of the maxillary sinus referred to ectasia of the facial wall as one of the most characteristic symptoms of empyema of this sinus. It was later demonstrated that invariably in those cases where an ectasia of the facial wall existed an empyema of the antrum was not present, but that by puncturing the sinus a clear fluid was found. These cases were still considered cases of antrum disease and in the literature were described as cases of "hydrops antri." We now know that those cases of "hydrops antri," that is, cases where on puncture a non-purulent fluid is found, are not cases of antrum trouble primarily, but are cases of maxillary or dental cysts which on enlarging en-

croach on the cavity of the antrum as well as produce an ectasia of its external wall.

DR. J. HOLINGER: Owing to an observation made within the last few weeks I have to disagree with Dr. Shambaugh. Not all swellings of the anterior wall of the antrum are due to cysts. Only yesterday I operated on a woman who had a swelling of the antral wall caused by a tumor. Several pieces were removed from different parts of the tumor and examined by different pathologists who agreed on the diagnosis granuloma. Upon clinical appearance I diagnosed sarcoma, which was found correct after the tumor was removed. The patient said that one side of her face had been swollen ever since she could remember, but that she had never had any trouble from that source. A photograph taken twenty years ago showed the swelling. Therefore I would not say that in all cases bulging of the anterior antral wall is due to a dentigerous cyst.

In this connection I want to remind you of the boy I showed you some years ago who had an abscess of the septum of the nose, and where a tooth appeared later in the front part, at first entirely out of place. That tooth is gradually growing into its normal position. Small sequestra are discharged, and appear every once in a while, either at the root of the teeth or at the base of the septum. There is only a membranous septum but no cartilaginous septum. I do not think that all cases of abscess of the septum of the nose ought to be attributed to errors in dentition.

DR. SHAMBAUGH: I had no intention of giving the impression that in all cases where there is a bulging of the antral wall a dentigerous cyst is present. I intended to say that no case of empyema of the antrum will cause an ectasia of the external wall of the antrum. This may be caused, of course, by a tumor.

DR. NORVAL H. PIERCE, (closing the discussion): I mentioned that we can have dilatation of the antrum accompanying tumors, and there may be a swelling of the face over the antrum in empyema of the antrum. when an osteomyelitis is set up, but that is not a dilatation. The history of such a case is so distinctive that it is impossible to err in the diagnosis.

Non-Suppurative Involvement of the Labyrinth in the Course of Mumps with Report of Two Cases. By G. H. BOOT, M. D.

A review of forty-nine cases from the literature and report of two additional cases from which he concludes that this complica-

tion occurs chiefly between the ages of 11 and 30, being slightly more common in the female. It is rapid in its onset and of three types:

1. Chiefly involving the cochlea and manifested by deafness of a labyrinthine type and tinnitis, but with little or no dizziness or vomiting.

2. Chiefly involving the semi-circular canals and manifested by vertigo and vomiting, with little or no deafness.

3. A combination of the preceding. The prognosis as to recovery of hearing is bad.

Treatment of the deafness is most apt to be successful if used early.

DISCUSSION.

DR. HARRY KAHN: It is important that one know the condition of the hearing in these cases before the attack of mumps commenced. If the labyrinth alone is involved, there is a short negative Rinné.

He makes no mention of testing the hearing for high tones, which is of great importance in the determination of labyrinthian disease and function. He also gives no data as to nystagmus. I would also take exception to his classification. I think that when the semicircular canals are involved the loss of hearing is complete in the cochlea, whereas in loss of hearing in the cochlea, the semicircular canals are not necessarily involved; but I do not believe that we can get involvement of the semicircular canals without involvement of the cochlea.

DR. GEO. E. SHAMBAUGH: This paper brings up the interesting condition of involvement of the internal ear in infectious disease. I had an opportunity of examining this case, and I saw one other case about five years ago, a young girl, 12 years of age, who had an attack of mumps. On the first day of the attack she suddenly became deaf in one ear accompanied by severe nausea and a period of vertigo lasting several weeks. I examined her several months afterward, and so far as I could ascertain there was no hearing left in one ear.

It is very interesting if it is true that one may have different parts of the labyrinth involved separately in this disease. From the clinical reports Dr. Boot has collected, it does seem that there are cases in which only the cochlea is involved, in others only the semicircular canals, and in still others the entire internal ear is involved. If these cases have been correctly reported, this fact may possibly throw some light on the cause of the disturbance in the internal

ear. Dr. Boot seems to consider it a mild form of infection and inflammation, but it seems to me that such an inflammation would be likely to involve all the structures of the interior ear. However, it may be possible that one can have an inflammation, mild in character, which will destroy the function in the cochlea and yet not in the vestibular apparatus.

The fact that separate parts of the labyrinth may be involved in this process suggests the probability that a process like embolism may be at the bottom of the trouble. The blood supply of the entire labyrinth comes through a single vessel, the labyrinthine artery, but separate branches form the sole arterial supply from distinct parts of the labyrinth because the labyrinthine arteries are of the type known as end arteries. The parts of the labyrinth that are thus separated by distinct arterial vessels are the horizontal and superior semicircular canals with the macula of the utricle, the posterior semicircular canal, the macula of the saccule, and the cochlea itself. With this division of the blood supply of the inner ear it is readily seen how a process like embolism might involve separate parts or the whole of the labyrinth.

Dr. A. H. Andrews: I remember a case in which there was deafness in both ears following an attack of mumps. A diagnosis had been made of hysterical deafness. I examined the patient and expressed the opinion that it was a case of labyrinthian involvement due to mumps and made a very unfavorable prognosis. The patient passed from my observation, and I can not make a further report.

Dr. Boot, (closing the discussion): In reply to Dr. Kahn's criticism, I wish to say that the patient was apparently totally deaf to the Galton whistle. In the other cases reported, its use was not mentioned. I did not test the patient for nystagmus. Possibly it was present, but it was not apparent without special search.

As to the classification, I do not see how we can classify these cases otherwise. Most of them showed involvement of both the semicircular canals and the cochlea, but a few of them showed such decided separate involvement. That these cases are probably much more common than is believed is doubtless true, but very few of them have been reported.

Exfoliation of the Labyrinth. By A. H. Andrews, M. D.

DISCUSSION.

Dr. J. Holinger: There are two pathologic processes that must be considered in this connection. One is pressure atrophy of the bone of the rear and upper wall of the external meatus. It is

found in so-called cholesteatoma of the external canal. The bone shrinks through the pressure exerted by the enlarging cholesteatomatous masses. The second process is a true necrosis. I described a case of most extraordinary extent in my report of the examination of the children of the deaf-mute institution in Jacksonville about ten years ago. The entrance of the external canal was normal, but immediately inside of it there was a cavity the size of a small walnut which was filled with cholesteatomatous masses. In the center of this mass, there was a piece of necrotic bone about the size of a pea. There was no facial paralysis, but the whole mastoid process was excavated and lined with a cholesteatomatous membrane. Cases of this kind have frequently been described by Bezold as early as 1883, as well as in the catalogue of the Toynbee collection.

DR. C. M. ROBERTSON: In one case I saw, the posterior wall was bulging, and on probing it, the instrument dropped into a cavity that extended back to the tip of the mastoid and followed in to the inner ear. These are cases of subacute otitis. Finally the sequestrum of the posterior wall comes out and the ear heals. I think that that is not at all uncommon in tuberculous patients. Of course, a cholesteatoma would produce an effect of this kind. I think that many such cases of complete exenteration are reported, not only involving the mastoid but also the deeper portions of the internal ear.

DR. NORVAL H. PIERCE: I have seen but one case of this kind, occurring in a man over forty, who was sent to me by an insurance company. He gave a history of running ear for a great number of years, the origin of which was uncertain. His ear had been dry for some years before I saw him. On examination there was every evidence of a typical radical mastoid operation. The outer wall of the attic was gone and there was a large opening where the atticus had been, about the size of a filbert. There was a strand of connective tissue running from the roof of the attic to the Fallopian canal. There was not the least moisture; the hole was covered by a cholesteatomatous membrane, dry, glistening, partially clear, and the hearing in the ear was exceptionally good.

DR. J. C. BECK: Dr. Dench showed an exfoliated cochlea, where, after healing had taken place, the test showed that the patient could hear in that ear. There must have been some remnants of the cochlea present in which hearing was preserved.

DR. A. H. ANDREWS, (closing the discussion): In this case the ear was suppurating, the bone conduction was down and the hear-

ing was so bad that the patient used a tube. In the ear which I have described, bone conduction is almost gone, and hearing is not good, although in my tests with the speaking tube I could not discover that the patient could not hear as well in that ear as in the other, showing that she must have some hearing. My observation of these cases is that in the tuberculous cases the bone comes away in a sequestrum, but in both my cases there was no history of any pieces of bone coming away, and I do not believe that one could say, from the history and the present conditions, that it could have been a cholesteatomatous process. I have two specimens of exfoliated labyrinths but I got them in attempted mastoid operations. In the case reported tonight, with the exception of the small canal which I would not like to exhibit as a radical mastoid operation, I would be glad to exhibit the case as an evidence of my skill in doing a radical mastoid.

Differential Diagnosis Between Involvements of the Labyrinth and Hysteria in a Case of Double Suppurative Otitis Media. By J. HOLINGER, M. D.

DISCUSSION.

DR. NORVAL H. PIERCE: In probably the greater number of cases of acute otitis media of severe type the internal ear is involved. This is proved by the fact that in a number of these cases the high tones are reduced either permanently or for a long time. I recently had a couple of cases return to me after ten and twelve years. There was a severe suppurative inflammation, but everything healed up and now I find in the ear most involved marked nervous deafness. These cases need not necessarily be suppurative processes but they may be plastic processes, and when we think of destruction of the internal ear, the easy access of micro-organisms or their ptomains, it seems strange that this is not more frequently the case in involvement of the internal ear.

I would like to have Dr. Holinger tell us something about the temperature in his first case. It has been stated that in suppurative cases confined to the labyrinth there is no elevation of temperature. That is a queer statement, yet coming from such a good man as Bezold, it is of importance.

DR. HARRY KAHN: The differential diagnosis of hysteria and internal ear disease is of great interest to me. In looking over the literature I find that everybody agrees that the hysterical ear may give the tuning fork test, which, if it is the only sign present, one may take for a pure labyrinthian deafness. Hammerschlag

shows that in labyrinthian deafness we do not have any organic changes and that tinnitus or vertigo are against hysteria and for an organic change. His test for hysteria is to note the difference between the whispered voice and the tuning fork. The former is heard three to six meters, whereas the tuning fork gives only the pure labyrinthian reaction. So that it is different from what we would expect. In hysterical deafness there are other manifestations of hysteria, and especially the loss of the sense of touch or a reduction of it, localized usually in the external meatus and even the membrani tympani may be anesthetic. So that it seems that in hysteria we do not have any organic change, whereas in the other, where there is vertigo, it is purely organic.

DR. GEO. E. SHAMBAUGH: It is not an uncommon thing to find marked symptoms of labyrinthine deafness come on during an attack of severe acute otitis media, and sometimes it persists permanently. A patient with good hearing, whom I saw recently, had a severe attack of acute otitis media in both ears. The patient heard nothing above mark "14" of the Edelmann Galton whistle in one ear and nothing above mark "9" in the other ear,—a marked degree of labyrinthine deafness. This defect was reduced to mark "5" and "4" for the two ears about three weeks after suppuration subsided. I do not think that this was a purulent inflammation in the labyrinth. A pus invasion, I believe, almost invariably results in total destruction of function.

In regard to the second case reported by Dr. Holinger it is interesting to find these cases of otosclerosis where the symptoms are those of labyrinthine deafness and not of anchylosis of the stapes. The first cases where a diagnosis of otosclerosis was clearly made, both from middle ear disease and from nerve deafness, were the typical cases of anchylosis of the stapes and the postmortem findings discovered in these the spongifying process limited to the region of the oval window. For this reason the term otosclerosis has in the minds of many often been taken synonymous with bony fixation of the stapes. As a matter of fact the underlying pathological process, that of spongifying of the capsule of the labyrinth, may take place in parts of the capsule at a distance from the oval window, thus producing the symptoms typical of labyrinthine deafness with an absence of the typical signs of fixation of the stapes.

It is of course comparatively easy to make a diagnosis of otosclerosis in cases where the process has produced a fixation of

the foot-plate of the stapes, provided there has not existed a previous middle ear disease to obscure the case. It is not so easy to make a diagnosis of otosclerosis when the foot-plate of the stapes has been left free, and when the deafness is of a labyrinthine type. In many of these cases the diagnosis will not be made except by the postmortem finding. Yet there are cases where the type of onset, the age of the occurrence of the deafness, the history of deafness in other members of the family, and perhaps the presence of Schwartz's symptom, the reddish glow transmitted to a normal membrana tympani from a congestion over the promontory, allows us to make a reasonably positive diagnosis of otosclerosis with spongifying of the capsule of the labyrinth, producing typical labyrinth deafness and none of the symptoms of middle ear deafness because the foot-plate of the stapes has been left free.

DR. A. H. ANDREWS: I would like to ask Dr. Holinger whether there is any way of making an immediate positive diagnosis of hysterical deafness. I have not been able to say that this is absolutely a case of hysterical deafness, although I have been able to say that I believed it to be such, but when the patient got well suddenly, independently of treatment, I felt very sure that it was a case of hysteric deafness.

DR. HOLINGER, (closing the discussion): Replying to Dr. Pierce, I can not say anything about the temperature previous to my examination. The temperature was taken regularly in the hospital and no rise was observed.

As to Dr. Andrew's question. The main point of my paper was to show that it was the tuning fork examination which really gave us the diagnosis, and this with absolute certainty. The psychic element was excluded and we had only objective findings to depend upon.

Regarding the second case, that of spongifying of the capsule of the labyrinth, Siebenmann in the last issue of the "Correspondenzblatt fuer Schweizer Aerzte," speaks of chronic progressive deafness as mentioned in Lucae's latest book. Siebenmann says that Lucae places the word "Otosclerosis" in quotation marks all through his book. This is to be supported from a pathologic-anatomical stand-point, because the progressive spongifying process which is at the bottom of the sclerosis, is not a sclerosis, but, on the contrary, a softening process of the bone. Had the expression of spongifying been kept, and otosclerosis never used, it would have been better, because much confusion would have been avoided.